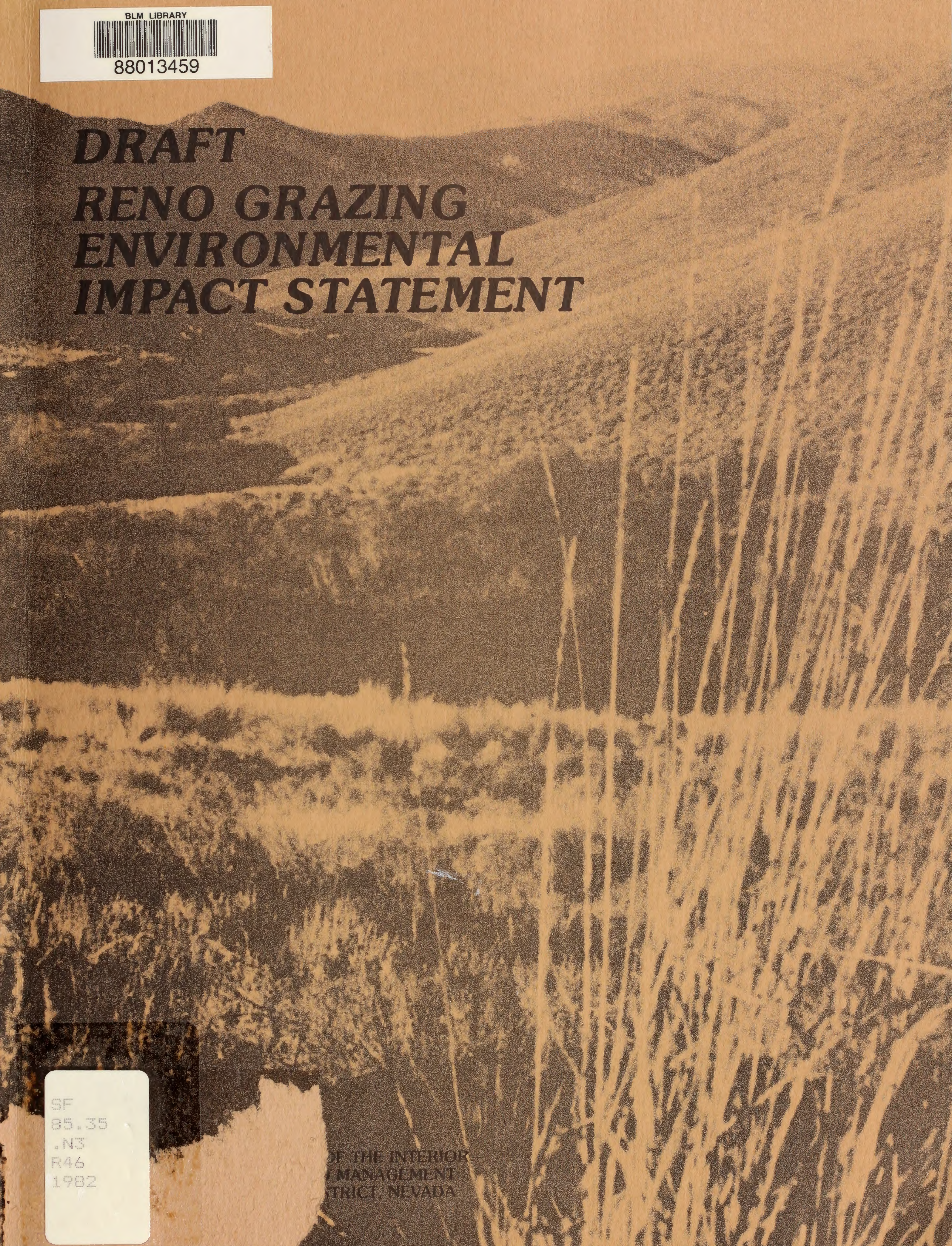
BLM LIBRARY
88013459



DRAFT
RENO GRAZING ENVIRONMENTAL IMPACT STATEMENT

SF
85.35
.N3
R46
1982

OF THE INTERIOR
MANAGEMENT
STRICT, NEVADA

88013459

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

SF
85.35
.N3
R46
1982

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

Proposed Domestic Livestock Grazing Management Program

for the

Reno Environmental Impact Statement Area

Nevada

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

Prepared by

Department of the Interior
Bureau of Land Management
Carson City District

Edward F Spang

Edward F. Spang
State Director
Nevada State Office

The Bureau of Land Management proposes to implement a livestock grazing management program for the Reno Environmental Impact Statement area of the Carson City District in Western Nevada. This program proposes certain management actions to solve similar problems associated with specific allotments through a selective management system. These actions consider utilization levels for livestock, mule deer and wild horses; needed range improvements and land treatments; a general implementation scheme; standard operating procedures, and the interrelationships with other programs in the area. Three alternatives, No Action, Maximization of Livestock and Resource Protection were considered along with the Proposed Action. A discussion of the affected environment and the environmental consequences occurring from the alternatives including the proposed action is also documented in the EIS.

For Further Information Contact:
Tom Owen, District Manager
1050 E. William St., Suite 335
Carson City, Nevada 89701
Date Comments Are Due

SUMMARY

SUMMARY

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The Bureau of Land Management (BLM) proposes to implement a livestock grazing management program in the Reno Environmental Impact Statement (EIS) area of the Carson City District.

The Reno EIS area consists of approximately 699,481 acres of public land located in southwestern Nevada (Land Status Map). Interspersed throughout the EIS area are various acres of private, state, and other lands. Also, the Toiyabe National Forest and the Plumas National Forest in California share boundaries with part of the EIS area.

Components of the alternatives including the proposed action include: (1) Vegetation Utilization (Summary Table 1); (2) Levels of Grazing Management (Summary Table 2) and, (3) Range Improvements and Land Treatments (Summary Table 3). Summary Table 4 compares the impacts of each resource as they relate to a given alternative. Also involved in each alternative, including the proposed action, is Coordinated Resource Management and Planning (CRMP) which is the method by which the Bureau's "publics" can get involved in the decision making process of land use planning. In part, the CRMP process will help establish vegetation utilization levels, implementation schedules, periods-of-use, etc.

Analysis of the alternatives, including the proposed action, has determined that there would be no significant impacts to visual resources, cultural resources, water quantity, threatened and endangered species, areas of critical environmental concern, wilderness and climate. This is due to either standard operating procedures or to impacts not exceeding a predetermined level of significance.

AREAS OF CONTROVERSY

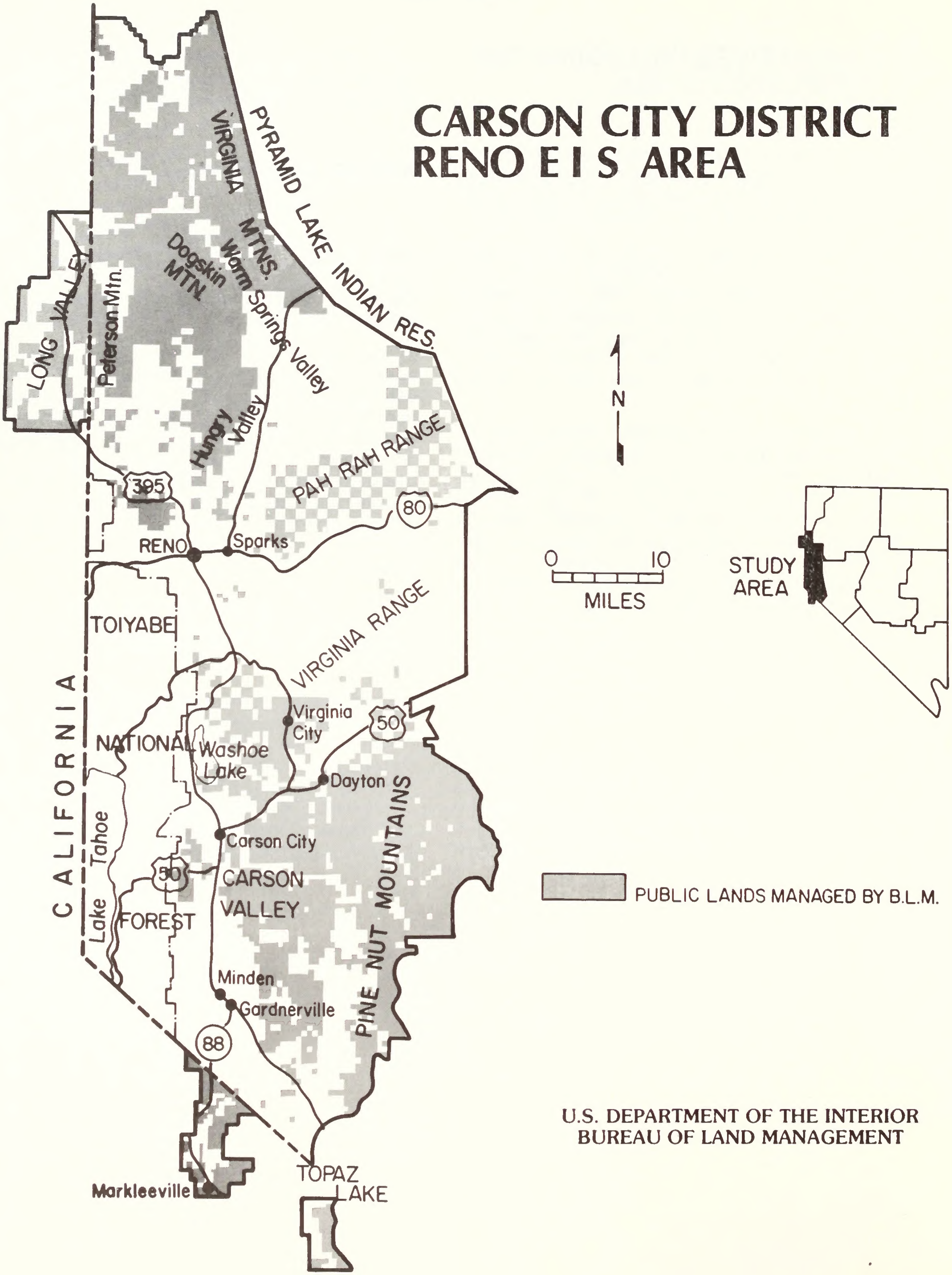
Public contacts have been made with interest groups, local and state governments, other federal agencies, and numerous individuals to determine the areas of concern with the proposed grazing management program for the Reno EIS area.

The main area of controversy involved the initial adjustments in livestock, wild horse and mule deer use based on completed range inventory information. Upon completion of the range survey, an analysis of the final calculated data indicated some inconsistency in vegetation production between areas of similar type vegetation with similar species composition and cover. Therefore, forage production data derived from the survey was not used for determining carrying capacity for individual allotments (Appendix E).

Other data derived from the survey, including range site potential information, is, however, used as a basis for analyzing vegetation impacts (Appendix D).

Future adjustments in use would be made over a five year period using a combination of monitoring information and inventory data and would begin immediately following completion of the EIS. Adjustments in use would first begin within those allotments where studies and inventory information indicate poor ecological condition, downward trend and excessive utilization above carrying capacity.

CARSON CITY DISTRICT
RENO E I S AREA



▨ PUBLIC LANDS MANAGED BY B.L.M.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUMMARY TABLE 1
VEGETATION UTILIZATION PROGRAM (AUMs)

Type of Action	Initial Utilization[a] Short Term				Future Utilization [b] Long Term			
	Livestock	Mule Deer	Wild Horses	Total	Livestock	Mule Deer	Wild Horses	Total
No Action Alternative	43,973	14,255	16,207	74,435	43,973	14,255	10,325	68,553
Proposed Action Alternative	43,973	14,255	16,207	74,435	30,618	18,401	10,325	59,344
Maximization of Livestock Alternative	43,973	14,255	0	58,228	61,415	19,010	0	80,425
Resource Protection Alternative	28,465	14,255	10,013	52,733	48,013	19,010	10,013	77,036

a/ Initial utilization for livestock under the No Action, Proposed Action, and Maximization of Livestock Alternatives is the last three years average licensed use. Under the Resource Protection Alternative initial livestock use is based on existing range utilization studies. Mule deer use is existing demand. Wild horse use is existing demand under No Action and Proposed Action (including 840 AUMS not within the EIS area out put of a herd unit), and adjusted use based on management objectives under the other alternatives. Actual adjustments would take place over a five year period under a given alternative.

b/ Future utilization for livestock is based on adjustments to moderate grazing levels plus additional AUMs derived through grazing systems, adjustments in wild horse numbers, range improvements, and land treatments (Van Poollen and Lacy, 1978). Mule deer use is based on reasonable numbers in Category I allotments plus existing demand in the other allotments. Wild horse use is adjusted according to management objectives. Actual adjustments in use would take place sometime after five years. As additional vegetation becomes available over the long term the available AUMs for mule deer could exceed reasonable numbers in a given allotment. The No Action alternative is the same as initial utilization.

SUMMARY TABLE 2
PROPOSED LEVELS OF GRAZING MANAGEMENT

Type of Action	CATEGORY [a/] M Allot.	M Acres	I Allot.	I Acres	C Allot.	C Acres
Proposed Action	10	43,798	10	434,100	35	221,583
No Action Alt.	0		0		0	
Max. of Livestock Alt.	10	43,798	10	434,100	35	221,583
Resource Protection Alt.	10	43,798	21	551,325	24	104,358

[a/] The grouping of allotments into Category M, I and C is not the proposed action. Rather the proposed action under a given alternative is the management action involved with correcting problems associated with a given group of allotments.

SUMMARY TABLE 3
POTENTIAL RANGE IMPROVEMENTS AND LAND TREATMENTS BY ALTERNATIVE

	PROPOSED ACTION	NO ACTION	MAXIMIZATION OF LIVESTOCK	RESOURCE PROTECTION
RANGE IMPROVEMENTS				
Fences	105 mi.	0	187 mi.	113 mi.
Troughs	95 ea.	0	95 ea.	124 ea.
Spring Boxes	41 ea.	0	41 ea.	55 ea.
Gabions	15 ea.	0	15 ea.	15 ea.
Culverts	3 ea.	0	3 ea.	3 ea.
Wells	1 ea.	0	1 ea.	1 ea.
Springs	8 ea.	0	8 ea.	8 ea.
Pipelines	2 mi.	0	2 mi.	2 mi.
Fence Removal	12 mi.	0	12 mi.	12 mi.
Cattleguards	8 ea.	0	8 ea.	8 ea.
LAND TREATMENTS				
Sagebrush Control and Seedings	6,655 ac.	0	13,313 ac.	6,655 ac.
Estimated Cost (Dollars)	$821,050	0	$1,440,950	$867,050

SUMMARY TABLE 4
SUMMARY COMPARISON OF IMPACTS
RENO EIS AREA

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
	SOILS		
Those allotments in Category M and C will show no significant change in current erosion, flooding and sediment damage.	Continued accelerated erosion rate and subsequent soil loss.	Same as No Action.	Same as Proposed Action.
Those allotments in Category I will show a significant decrease in erosion, flooding and sedimentation in riparian habitat and critical watershed areas.	Continued increase in flooding and sedimentation damage in unprotected riparian habitat and critical watershed areas.		
	WATER QUALITY		
Waters located in Category M and C allotments will show little change in water quality.	Those streams currently exceeding water quality standards and those streams not exceeding the standards will show degraded quality over time.	Same as No Action.	Same as Proposed Action.
Those allotments in Category I will have significant improvement in water quality due to intensive management, range improvements, and riparian habitat protection.			

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
		VEGETATION	
CATEGORY I ALLOTMENTS	ALL ALLOTMENTS	CATEGORY I ALLOTMENTS	CATEGORY I ALLOTMENTS
Ecological Condition (Native Range)	Ecological Condition (Native Range)	Ecological Condition (Native Range)	Ecological Condition (Native Range)
1% increase (3,017 acres) in excellent condition	<1% increase (3 acres) in excellent condition	1% increase (2,991 acres) in excellent condition	1% increase (3,994 acres) in excellent condition
4% increase (28,448 acres) in good condition	<1% decrease (4,048 acres) in good condition	4% increase (27,837 acres) in good condition	5% increase (33,934 acres) in good condition
2% decrease (12,687 acres) in fair condition	2% decrease (13,584 acres) in fair condition	2% decrease (12,476 acres) in fair condition	2% decrease (11,752 acres) in fair condition
3% decrease (18,778 acres) in poor condition	3% increase (17,899 acres) in poor condition	3% decrease (18,352 acres) in poor condition	4% decrease (26,203 acres) in poor condition
Forage Condition (seedings)	Forage Condition (seedings)	Forage Condition (seedings)	Forage Condition (seedings)
No increase (15 acres) in excellent condition	No increase in excellent condition	Same as Proposed Action	2% increase (207 acres) in excellent condition
4% increase (374 acres) in good condition	2% increase (180 acres) in good condition		3% increase (299 acres) in good condition
3% decrease (289 acres) in fair condition	2% increase (162 acres) in fair condition		3% decrease (352 acres) in fair condition
1% decrease (100 acres) in poor condition	<1% decrease (18 acres) in poor condition		2% decrease (154 acres) in poor condition

SUMMARY TABLE 4
SUMMARY COMPARISON OF IMPACTS
RENO EIS AREA

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
	VEGETATION (cont.)		
Ecological Condition (Riparian Habitat)	Ecological Condition (Riparian Habitat)	Ecological Condition (Riparian Habitat)	Ecological Condition (Riparian Habitat)
1% increase in excellent condition	No increase in excellent or good conditions	Same as Proposed Action	Same as Proposed Action
10% increase in good condition	4% increase in fair and poor condition	(Aspen Habitat)	(Aspen Habitat)
3% decrease in fair condition		Same as Proposed Action	Same as Proposed Action
	(Aspen Habitat)		
8% decrease in poor condition	2% increase in poor condition	Upward trend increase from 43,649 acres to 415,315 acres in Category I Allotments	Upward trend will increase from 43,649 to 551,916 acres in Category I Allotments
(Aspen Habitat)	Continued downward trend		
1% increase in excellent condition			
3% increase in good condition			
2% increase in fair condition			
6% decrease in poor condition			
Upward trend increase from 43,649 acres to 458,964 acres in Category I Allotments			

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
		WILDLIFE	
Short-Term	Short-Term	Short-Term	Short-Term
Mule deer demand is 14,255 AUMs. No increase in mule deer, sage grouse, chukar or nongame bird numbers.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.
Long-Term	Long-Term	Long-Term	Long-Term
Mule deer demand increases from 14,255 AUMs to 18,401 AUMs.	Mule deer numbers would eventually decline.	Mule deer demand would increase from 14,255 AUMs to 19,010 AUMs.	Mule deer demand would be as in maximizing livestock.
50% increase in sage grouse numbers.	Sage grouse populations would eventually decline.	Sage grouse would be as in the Proposed Action.	100% increase in sage grouse numbers.
Slight increase in chukar numbers.	Chukar population would not be affected except by climatic condition.	Chukar would be as in the Proposed Action.	Chukar population would remain static or increase slightly.
Slight increase in nongame bird numbers.	Overall decline in nongame bird populations.	Nongame birds would be as in No Action.	Nongame bird numbers would be as in the Proposed Action.

SUMMARY TABLE 4
SUMMARY COMPARISON OF IMPACTS
RENO EIS AREA

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
		WILD HORSES	
Wild horse demand will be reduced from 16,207 AUMs to 10,325 AUMs due to removal from Indian and private lands.	Wild horse herds would eventually be reduced due to continued loss of vegetation through continued over-utilization.	All wild horses would be removed from the EIS area.	Wild horses would be significantly reduced in the EIS area from demand of 16,207 to 10,013 AUMs.
	Wild horse demand would be the same as under the Proposed Action.		
		RECREATION	
Recreational hunting, fishing and wildlife viewing would be enhanced over the long term as mule deer, sage grouse, chukar, and nongame bird numbers would increase.	Mule deer numbers would not meet hunting demand.	There would be no viewing opportunities of wild horses.	Similar to the Proposed Action.
Mule deer numbers would not meet hunting demand.	There would be no construction of range improvements or seedings to form barriers or prohibit non-motorized recreation opportunities.	Mule deer, sage grouse and chukar numbers would increase over the long term which would enhance hunting opportunities.	
Fencing riparian habitat could present a barrier to movement on horseback or by foot.		Fencing and seedings would cover problems as in the Proposed Action.	
A loss of undeveloped non-motorized recreation opportunities due to proposed range improvements and seedings.			

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
	LIVESTOCK GRAZING		
Utilization Summary (See Summary Table 1)	Utilization Summary (See Summary Table 1)	Utilization Summary (See Summary Table 1)	Utilization Summary (See Summary Table 1)
Increased calf and lamb crops, and higher weaning weights.	Reduced calf and lamb crop percentages and lower weaning weights. Increase in death loss, decrease in income.	Increase in calf and lamb crops and higher weaning weights.	Increase in calf and lamb crops and higher weaning weights.
	ECONOMICS		
Short Term	Short Term	Short Term	Short Term
Regional Earnings - $650,000	0	- $450,000	- $750,000
Regional Employment - 45	0	- 30	- 50
Long Term	Long Term	Long Term	Long Term
Regional Earnings - $550,000	- $1,000,000	+ $700,000	- $200,000
Regional Employment - 35	- 70	+ 50	- 30

SUMMARY TABLE 4
SUMMARY COMPARISON OF IMPACTS
RENO EIS AREA

PROPOSED ACTION	NO ACTION	MAXIMIZING LIVESTOCK	RESOURCE PROTECTION
		SOCIOLOGY	
Ranching Community	Ranching Community	Ranching Community	Ranching Community
The concept of CRMP was favorably accepted. All ranchers viewed this process as beneficial to their operations. All ranchers felt that wild horses should be reduced. Most ranchers viewed monitoring as a productive tool but some expressed concern that reduction in livestock might result.	The reaction was positive to the concept of No Action. There was negative reaction to the concept of no new range improvements.	Favorably received.	Possible initial adjustments in livestock numbers not entirely accepted.
State and National	State and National	State and National	State and National
Personal interviews indicated that the Proposed Action would result in continued deterioration of the rangelands as there is too much emphasis on the livestock industry.	Same as Proposed Action.	Highly negative impacts as this could result in extreme deterioration of the rangeland.	Wild horse groups feel this is a deterrent to opportunities to view wild horses. Favorable to wildlife and recreation groups.

TABLE OF CONTENTS

SUMMARY iii
  Alternatives, Including The Proposed Action ... iii
  Areas of Controversy iii

CHAPTER 1 - ALTERNATIVES INCLUDING THE PROPOSED ACTION 1-1

PURPOSE AND NEED 1-1

PROPOSED ACTION 1-1
  Grazing Treatments and Systems

NO ACTION ALTERNATIVE 1-7

MAXIMIZATION OF LIVESTOCK ALTERNATIVE 1-7

RESOURCE PROTECTION ALTERNATIVE 1-7

STANDARD OPERATING PROCEDURES 1-11
  Inherent Requirements 1-11
  Management Supervision Procedures 1-15
    Evaluation And Modification Administration 1-15
    Administration 1-16

IMPLEMENTATION 1-16
  Coordinated Resource Management and Planning. 1-16
  Selective Management 1-16
  Levels/Grazing Management/Implementation Priority 1-16
  Range Improvements 1-18

CHAPTER 2 - AFFECTED ENVIRONMENT 2-1

SOILS 2-1
  Erosion 2-1
  Sediment Yield 2-1
  Flood And Sediment Damage 2-1

WATER RESOURCES 2-1
  Water Quantity 2-3
    Rivers And Streams 2-3
    Lakes And Reservoirs 2-3
    Water Uses 2-3
  Water Quality 2-3

VEGETATION 2-3
  Range Sites And Condition Classes 2-3
  Riparian And Aspen Communities 2-6
  Trend 2-9
  Small Vegetation Types 2-9

WILDLIFE 2-13
  Mule Deer 2-13
  Sage Grouse 2-14
  Chukar 2-14
  Nongame Birds 2-14

WILD HORSES 2-15

RECREATION 2-15

LIVESTOCK GRAZING 2-16
  Kind of Operation 2-16

SOCIAL AND ECONOMIC CONDITIONS 2-16
  Regional Economic Conditions 2-16
  Ranch Economics 2-17
    Ranching Industry 2-17
  Wildlife Economics 2-20

SOCIAL CONDITIONS 2-22
  Livestock Community 2-22
    Lifestyle 2-22
    Attitudes 2-22
  Regional 2-23
  State And National 2-23

CHAPTER 3 - ENVIRONMENTAL CONSEQUENCES 3-1

INTRODUCTION 3-1

ASSUMPTIONS AND ANALYSIS GUIDELINES 3-1

PROPOSED ACTION 3-2

SOILS 3-2

WATER QUALITY 3-2

VEGETATION 3-2

Ecological Condition, Forage Condition And Trend 3-2
Riparian And Aspen Communities 3-4

WILDLIFE 3-5
Mule Deer 3-5
Sage Grouse 3-5
Chukar 3-6
Nongame Birds 3-6

WILD HORSES 3-6

RECREATION 3-6

LIVESTOCK GRAZING 3-6

ECONOMIC IMPACTS 3-7

SOCIAL ANALYSIS 3-7
Ranching Community 3-7
State And National 3-9

NO ACTION ALTERNATIVE 3-9

SOILS 3-9

WATER QUALITY 3-9

VEGETATION 3-9
Ecological Condition, Forage Condition And Trend 3-9
Riparian And Aspen Communities 3-10

WILDLIFE 3-10
Mule Deer 3-10
Sage Grouse 3-11
Chukar 3-11
Nongame Birds 3-11

WILD HORSES 3-11

RECREATION 3-11

LIVESTOCK GRAZING 3-11

ECONOMIC IMPACTS 3-12

SOCIAL ANALYSIS 3-12
Ranching Community 3-12
State And National 3-12

MAXIMIZATION OF LIVESTOCK ALTERNATIVE 3-12

SOILS 3-12

WATER QUALITY 3-14

VEGETATION 3-14
Ecological Condition, Forage Condition And Trend 3-14
Riparian And Aspen Communities 3-15

WILDLIFE 3-15
Mule Deer 3-15
Sage Grouse 3-16
Chukar 3-16
Nongame Birds 3-16

WILD HORSES 3-16

RECREATION 3-17

LIVESTOCK GRAZING 3-17

ECONOMIC IMPACTS 3-17

SOCIAL ANALYSIS 3-17
Ranching Community 3-17
State And National 3-19

RESOURCE PROTECTION ALTERNATIVE 3-19

SOILS 3-19

WATER QUALITY 3-19

VEGETATION 3-19
Ecological Condition, Forage Condition And Trend 3-19
Riparian And Aspen Communities 3-20

WILDLIFE 3-21
Mule Deer 3-21
Sage Grouse 3-22

Chukar 3-22
Nongame Birds 3-22

WILD HORSES 3-22

RECREATION 3-22

LIVESTOCK GRAZING 3-22

ECONOMIC IMPACTS 3-23

SOCIAL ANALYSIS 3-23
Ranching Community 3-23
State And National 3-23

UNAVOIDABLE ADVERSE IMPACTS 3-25

RELATIONSHIP BETWEEN SHORT TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTION 3-25

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES 3-26

CHAPTER 4 4-1

LIST OF PREPARERS 4-1

CONSULTATION AND COORDINATION 4-1

APPENDICES

APPENDIX A ....

Soil Surveys Conducted in the Reno EIS Area 5-1

APPENDIX B ....

Section 1 - Water Quality Specification 5-3

Section 2 - Estimated Annual Consumptive Use for Water Resources 5-7

Section 3 - Water Quality Criteria 5-8

Section 4 - Water Quality Sampling Sites 5-12

APPENDIX C ....

Section 1 - Methodology for the Preparation of Support Tables 5-17

Section 2 - Woodland Acreage Tabulation 5-18

APPENDIX D ....

Section 1 - Methodology for Determining Ecological Condition Class 5-21

Section 2 - Soil Vegetation Method (SVIM) 5-22

APPENDIX E ....

Section 1 - Background Information 5-25

Section 2 - Range Site Potentials 5-26

APPENDIX F ....

Methodology for Predicting Improvement or Deterioration of Vegetation Condition 5-41

APPENDIX G ....

Section 1 - Methodology for Predicting Future Production of Proposed Seedings 5-59

Section 2 - Methodology for Predicting Future AUM Production 5-62

APPENDIX H ....

Methodology for Determining Existing Mule Deer Numbers 5-65

APPENDIX I ....

VRM Classes for Public Lands 5-67

APPENDIX J ....

Recreation Opportunity Spectrum 5-69

APPENDIX K ....

Specific Criteria for Grouping Allotments into Selected Management Categories 5-71

APPENDIX L ....

Section 1 - Scope of Economic Analysis 5-85

Section 2 - Economic Impact Analysis Assumptions 5-86

Section 3 - Linear Programming Models 5-88

Section 4 - Ranch Budgets 5-90

Section 5 - Methodology for Economic Analyses of Deer Hunting 5-93

APPENDIX M..

Section 1 - Social Analysis Thresholds..........................5-95

Section 2 - Methodology for Social Analysis..................5-96

GLOSSARY..6-1

BIBLIOGRAPHY 7-1

LIST OF TABLES

CHAPTER 1

1-1 Existing Situation - Alternatives Including the Proposed Action 1-2
1-2 Reasonable Numbers of Mule Deer 1-5
1-3 Potential Improvements - Proposed Action 1-6
1-4 Wild Horse Use and Management Areas 1-8
1-5 Potential Improvements - Maximization of Livestock Alternative 1-9
1-6 Wild Horse Removal Schedule - Maximization of Livestock Alternative 1-10
1-7A Resource Protection Alternative 1-12
1-7B Resource Protection Alternative 1-13
1-8 Potential Improvements - Resource Protection Alternative 1-14
1-9 Recommended Implementation Priority - Category I Allotments 1-17

CHAPTER 2

2-1 Flood and Sediment Damage 2-2
2-2 Water Quality Suitability for Selected Beneficial Uses 2-4
2-3 Ecological Range and Forage Condition by Range Site 2-7
2-4 Existing Situation - Vegetation Condition and Trend Summary by Allotment 2-10
2-5 Small Vegetation Types / Wildlife Habitats by Allotment 2-12
2-6 Income and Employment 2-18
2-7 Ranch Characteristics - 1979 2-19
2-8 Summary of Ranch Budget and Dependency Data 2-21

CHAPTER 3

3-1 Ranch Economic Impacts - Proposed Action 3-8
3-2 Ranch Economic Impacts - No Action Alternative 3-13
3-3 Ranch Economic Impacts - Maximization of Livestock Alternative 3-18
3-4 Ranch Economic Impacts - Resource Protection 3-24

APPENDIX TABLES

3-1 Appendix B, Section 3 - Water Quality Criteria for Beneficial Uses 5-8
2-1 Appendix C, Section 2 - Woodland Acreage Tabulation 5-19
2-1 Appendix E, Section 2 - Range Sites and Acreage Tabulation by Site 5-30
2-2 Appendix E, Section 2 - Predicted Percent of Acres Shifting from One Condition Class to Another at Five and Ten Years in the Future - No Action Alternative 5-40
2-3 Appendix E, Section 2 - Predicted Percent of Acres Shifting - Proposed Action, Resource Protection, Maximization of Livestock 5-40
1-1 Appendix F - Ecological Range Condition (Acres) - Proposed Action 5-44
1-2 Appendix F - Percent Change in Vegetation Condition - Proposed Action 5-46
1-3 Appendix F - Ecological Range and Forage Condition (Acres) - No Action Alternative 5-48
1-4 Appendix F - Figure 1-4 Predicted Changes in Ecological/Forage Condition 5-50

1-5 Appendix F - Ecological Range Condition (Acres) - Maximization of Livestock 5-52

1-6 Appendix F - Percent Change in Vegetation Condition - Maximization of Livestock 5-54

1-7 Appendix F - Ecological Range Condition (Acres) - Resource Protection 5-56

1-8 Appendix F - Percent Change in Vegetation Condition - Resource Protection 5-58

1-1 Appendix G, Section 1 - Weighted Average Initial Stocking Rate (Ac/AUM) Values 5-61

2-1 Appendix G, Section 2 - SCS Range Site Correlation for AUM Predictions 5-64

4-1 Appendix L, Section 4 - Ranch Budgets 5-91

4-2 Appendix L, Section 4 - Reno Area Ranch Livestock and Resource Statistics 1979 5-92

MAP TITLES..

Land Status ....

Grazing Allotments and Horse Use Areas ....

Water Quantity ....

Flood and Sediment Damage ....

Vegetation Types ....

Mule Deer and Sage Grouse Habitat ....

Visual Resource Management Classes and Recreation Opportunity ....

CHAPTER 1

ALTERNATIVES INCLUDING THE PROPOSED ACTION

CHAPTER 1

ALTERNATIVES INCLUDING THE PROPOSED ACTION

PURPOSE AND NEED FOR ACTION

The purpose of the Reno Grazing Environmental Impact Statement *(EIS)* is to analyze the potential environmental impacts of implementing a grazing management program in the EIS Area. This EIS is being prepared in compliance with section 102(2)C of the *National Environmental Policy Act (NEPA)* of 1969. It will follow guidance as outlined in the *Council on Environmental Quality (CEQ)* regulations of November 29, 1978.

An EIS was deemed necessary by the Bureau of Land Management *(BLM)* as a result of a 1973 suit filed in federal court by the *National Resource Defense Council (NRDC)* stating that the BLM's programmatic grazing EIS approach was not adequate and did not comply with NEPA.

In addition to the Proposed Action, three alternatives are being analyzed in the EIS. They are: No Action, Maximization of Livestock, and Resource Protection. An alternative considered but eliminated from study was No Livestock Grazing. This alternative was eliminated because it was considered to be unreasonable and unrealistic per Nevada Instruction Memorandum NV-82-61.

PROPOSED ACTION

Through an allotment analysis using the criteria outlined in Appendix K, allotments in the Reno EIS area have been grouped into three management categories (Table 1-1), according to similiar resource conflicts and/or problems. The proposed action, the Bureau's preferred alternative, is to implement certain management actions or combination of actions necessary to correct these problems. Management objectives for each of the categories M, I and C are as follows: (1) "maintain" current satisfactory condition; (2) "improve" current unsatisfactory condition; and (3) manage in a "custodial" capacity, while protecting existing resource values.

Following is a discussion by category of specific problems, objectives and proposed management actions to eliminate the problems.

CATEGORY M ALLOTMENTS

Problems - None identified.

Objectives - Maintain the existing situation to include ecological condition (Table 2-4), and livestock and mule deer utilization levels (Table 1-1).

Management Actions -

Short-Term: (0-5 years) - Continue monitoring in order to detect changes from the existing situation. Grazing decisions would be issued within nine months after the final EIS is published.

Long-Term: (5 years plus) - If monitoring programs indicate there are significant resource problems developing, the allotments could be added to Category I.

CATEGORY I ALLOTMENTS

In all of the allotments:

Problems -

1) Present ecological condition is unsatisfactory and range trend is apparently downward.
2) There is excessive utilization of vegetation by livestock, wild horses and mule deer.
3) Periods-of-use are not necessarily adequate to meet the physiological requirements of key vegetation species or management objectives.
4) There is unsatisfactory forage production.
5) There is critical mule deer winter range which is not adequately protected.

Objectives -

1) Improve ecological condition and trend.
2) Improve forage production.
3) Lessen the conflicts between mule deer, livestock and wild horses in critical deer winter ranges.
4) Implement intensive management systems.
5) Manage mule deer habitat for reasonable numbers (Table 1-2).

Management Actions -

Short Term: (0-5 years) -

TABLE 1-1
EXISTING SITUATION

ALLOTMENT [b]	ACRES PUBLIC LAND	EXISTING PERIODS-OF-USE 1979 - 1980	TOTAL GRAZING PREFERENCE (AUMs) [c]	LAST THREE YEARS AVERAGE USE (AUMs)	MULE DEER DEMAND (AUMs)	WILD HORSE DEMAND (AUMs)
CATEGORY M [d]						
Bagley Valley	5,768	08-01 to 08-31	132	125	1,423	-
		06-01 to 10-15	2,168	773	-	-
Barney Riley	1,985	06-01 to 09-30	220	147	50	-
Carter Station	1,251	-	-	-	331	-
Hallelujah Jct.	12,154	04-15 to 11-30	1,176	1,180	534	-
Hardscrabble	11,575	03-01 to 10-31	1,222	1,160	117	-
Haypress	1,440	06-16 to 09-30	175	175	90	-
Harvey Flat	4,312	04-01 to 10-31	300	105	447	-
Indian Hills	3,143	04-16 to 06-15	250	non-use	403	-
Millberry Canyon	1,480	06-01 to 07-31	40	16	-	-
Wade Valley	690	04-16 to 06-15	60	60	549	-
SUBTOTAL	43,798		5,743	3,741	3,944	0
CATEGORY I						
Winnemucca Ranch [e]	43,457	Year Round	6,942	7,503	1,039	-
Flanigan	56,639	03-01 to 10-31	7,368	5,017	154	4,308
		12-01 to 02-28	-	-	-	-
Churchill Canyon	44,027	04-01 to 07-15	5,394	2,823	232	1,214
Pinenut	19,379	06-01 to 08-31	1,150	542	250	1,137
		06-01 to 09-30	-	-	-	-
Sunrise	17,804	06-01 to 09-30	750	non-use	427	986
		05-01 to 07-31	342	non-use	-	-
Buckeye [f]	87,184	03-01 to 02-28	5,216	4,550	313	2,654
Paiute Canyon [g]	73,567	03-01 to 02-28	4,934	4,511	887	96
Big Canyon	14,898	04-01 to 12-31	3,050	2,776	202	-
Constantia	19,830	04-01 to 10-15	1,246	1,036	730	-
Antelope Mountain	57,315	05-15 to 10-31	8,447	3,103	1,268	432
SUBTOTAL	434,100		44,839	31,861	5,502	10,827
CATEGORY C						
Black Springs	4,102	05-01 to 10-31	166	166	-	-
Carson Plains	5,027	04-01 to 05-15	565	126	1	-
Clifton	23,247	09-01 to 05-31	772	432	93	531
Cottonwood	3,584	05-01 to 10-31	202	non-use	21	278
Diamond Valley	473	-	-	-	-	-
Double Springs	752	05-01 to 09-30	44	44	226	-
Dry Lake	3,295	-	-	-	18	-
Duck Hill	3,956	06-01 to 12-15	248	61	15	-
		04-01 to 05-30	77	-	-	-
		03-15 to 05-30	322	-	-	-
Eldorado	10,261	-	-	-	185	228
Faye Canyon	650	-	-	-	-	-
Galena Creek	1,849	05-16 to 07-15	60	non-use	98	-
		04-16 to 05-20	50	29	-	-
Gold Hill	18,148	-	-	-	12	-
Hackett Canyon	6,644	12-16 to 05-31	483	non-use	215	152
		05-16 to 07-31	32	-	-	-

ALTERNATIVES INCLUDING THE PROPOSED ACTION [a]
RENO EIS AREA

ALLOTMENT [b]	ACRES PUBLIC LAND	EXISTING PERIODS-OF-USE 1979 - 1980	GRAZING PREFERENCE (AUMs) [c]	LAST THREE YEARS AVERAGE USE (AUMs)	MULE DEER DEMAND (AUMs)	WILD HORSE DEMAND (AUMs)
(CATEGORY C)						
Hangman	450	-	-	-	-	-
Haskell Peak	3,335	-	67	-	91	-
Indian Creek	2,451	05-01 to 11-01	365	234	1,560	-
Jumbo	2,359	05-01 to 05-31	478	348	229	168
		" "	278	192	-	-
		05-01 to 06-30	1,098	780	-	-
		04-01 to 06-06	139	non-use	-	-
		04-15 to 07-31	30	22	-	-
Kings Canyon	2,688	05-15 to 06-14	276	102	-	-
		12-01 to 12-31	-	-	-	-
Koch Ditch	431	03-01 to 04-30	950	20	-	-
		12-01 to 02-28	-	-	-	-
Luther Creek	270	-	-	-	-	-
Mill Canyon	19,064	04-01 to 05-15	2,049	600	61	303
		01-01 to 01-31	-	-	-	-
Mud Lake	2,770	05-01 to 09-30	251	251	382	-
Mustang	8,278	10-01 to 11-30	150	150	21	195
		10-01 to 11-30	150	150	-	-
Olinghouse	30,502	04-01 to 10-31	650	646	92	750
		" "	596	596	-	-
		" "	469	161	-	-
Pah Rah	4,525	09-01 to 02-28	205	non-use	11	361
Peavine	4,102	05-01 to 10-31	134	134	823	-
Peavine Watershed [h]	3,091	05-01 to 06-30	-	407	-	-
Plumas Station	6,780	04-01 to 09-30	429	429	284	-
Prison Hill	2,414	-	-	-	-	-
Rawe Peak	6,648	06-16 to 07-26	552	236	208	379
Sand Canyon	3,588	04-01 to 06-15	250	non-use	11	-
Spanish Springs	9,489	04-16 to 09-30	412	430	14	250
		04-16 to 09-30	279	379	-	-
Spratt Creek	664	-	-	-	-	-
Wedekind	9,062	04-15 to 06-15	123	123	-	-
White Hills	16,634	04-16 to 10-31	1,123	1,123	138	945
SUBTOTAL	221,583		14,524	8,371	4,809	4,540
GRAND TOTAL	699,481		65,106	43,973	14,255	15,367[i]

[a] Excluding the Maximization of Livestock and Resource Protection Alternatives.

[b] Those allotments that do not have active livestock grazing show no current periods-of-use.

[c] Livestock grazing preference is the total number of AUMs of livestock grazing demand on public lands apportioned and attached to a land or water based property controlled by a permittee or lessee.

[d] Categorical ranking applies to all alternatives except No Action and No Livestock Grazing.

[e] Includes temporary license.

[f] Buckeye Allotment includes Fish Springs and Jacobsen Allotments.

[g] Paiute Canyon Allotment includes Hungry Valley and Shovel Springs Allotments.

[h] Peavine Watershed has had authorized sheep use on a temporary license to reduce fire hazard.

[i] Does not include 840 AUMs in the Fort Sage and Buckskin Units located outside the EIS area.

Source: US Department of the Interior, Bureau of Land Management, Carson City District, Grazing License Files, 1980-81.

1) Develop range improvements to protect mule deer habitat and to improve livestock and wild horse distribution and vegetation utilization (Table 1-3). This would include 23 miles of fencing for mule deer habitat protection. Some specific areas for protection include Stateline Peak, Lower Wild Cat Creek, Sunrise Camp, Bull Run Spring, Shallow Spring, and Long Valley Creek. Site specific exclosures of approximately 100 ft. by 100 ft. in size comprise most of the proposed protection. This would help solve problems 1, 2, and 5 so that objectives 1, 3 and 5 can be met.

2) Continue to monitor and/or inventory to quantify the degree of conflicts and identify opportunities for future developments. Initial livestock, wild horse and mule deer use would be at existing levels (Table 1-1).

3) Begin Coordinated Resource Management and Planning (CRMP). Note: Adjustments in livestock use could begin during the short term in those allotments where excessive utilization is occuring which would help solve problem 2. The need for such adjustments will be identified and quantified through an ongoing monitoring effort and CRMP. *Allotment Management Plans (AMPs)* will also be developed as required. Grazing decisions will be issued within 17 months after publication of the final EIS unless funding and workforce capabilities are insufficient. These decisions will describe allotment objectives, initial stocking levels reached through consultation, and the inventory and monitoring studies that would be used to determine adjustments in stocking levels.

Long Term: (5 year plus) - Through CRMP propose:

1) Possible adjustments in periods-of-use. This would help solve problems 3 and 4.

2) Continued adjustments in livestock use levels based on utilization studies where applicable. This would help solve problem 2 and 4.

3) Adjustments in wild horse use levels where applicable (Table 1-4). This would help solve problems 2 and 4.

4) Manage mule deer habitat and provide forage for reasonable numbers (Table 1-2). This would help solve problems 2 and 5.

5) Implement AMPs and use grazing treatments to develop grazing systems that would help to improve ecological condition and provide additional vegetation. This would help solve problems 1, 2, 3, 4 and 5 so that all objectives can be met.

6) Develop land treatments to provide additional vegetation for livestock, mule deer and wild horses (Table 1-3). This would help solve problems 2 and 4.

GRAZING TREATMENTS AND SYSTEMS

A grazing treatment describes the level of grazing and periods-of-use for a unit (usually a pasture) of an allotment or an entire allotment in one or more years. Grazing treatments are the building blocks of the grazing system, and are designed to improve rangeland condition by manipulating livestock grazing to accomplish objectives of management. The deferrment of grazing or complete rest from grazing during the critical growth period of key management species would allow these species to maintain and/or increase their density, composition, vigor, production and reproduction. The following rest treatments (singly or in various combinations) would be combined with scheduled grazing treatments to form grazing systems in AMPs that would be used in the EIS area.

Treatment 1: Rest from livestock grazing for two consecutive growing seasons (approximately May 1 of one year to August 31 of the following year). Two growing seasons of rest would allow key management species to improve vigor, increase litter accumulation, seed production and seedling establishment. Rest for two growing seasons is required in order for grass seedlings to develop adequate root growth to withstand appreciable grazing and trampling (Hormay, 1970).

Treatment 2: Livestock grazing from midsummer to fall (approximately July 16 to November 15--dates vary with allotment). Grazing after seed-ripe would provide better seed dispersal and trampling. When coupled with other treatments that provide for spring rest the following year, the treatment would allow an improvement in plant vigor and seedling establishment for key grass species and many shrubs.

Treatment 3: Provide rest from livestock grazing for two years, until seedlings are established or until it is determined that a vegetation manipulation or recovery project is unsuccessful. This treatment provides the protection necessary for establishment or recovery of key management species following wildfire, seeding, burning or herbicide spraying projects.

Treatment 4: Defer livestock grazing from early spring to midsummer each year (approximately April 1 to June 30). This treatment would be required yearly and would be retained until the systems are implemented. Improved vigor and reproduction of key management species in each allotment would result.

TABLE 1-2
REASONABLE NUMBERS OF MULE DEER
CATEGORY I ALLOTMENTS

ALLOTMENT	REASONABLE NUMBERS[a] (AUMs)
Winnemucca Ranch	2,047
Flanigan	305
Churchill Canyon	256
Pinenut	285
Sunrise	471
Buckeye [b]	345
Paiute Canyon [c]	1,601
Big Canyon	399
Constantia	1,439
Antelope Mountain	2,500
SUBTOTAL	9,648
Clifton	102
Duck Hill	14
Hackett Canyon	236
Jumbo [d]	450
Kings Canyon	0
Mustang	41
Olinghouse	182
Plumas Station	557
Rawe Peak	229
Spanish Springs	4
White Hills	273
SUBTOTAL	2,088
TOTAL	11,736

[a] As additional vegetation becomes available over the long term, the available AUMs for mule deer could exceed reasonable numbers in a given allotment.

[b] Buckeye Allotment includes Fish Springs Allotment.

[c] Paiute Canyon Allotment includes Hungry Valley and Shovel Springs allotments.

[d] Includes Gold Hill Allotment.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, Management Framework Plan, Step 2, 1981.

TABLE 1-3
POTENTIAL IMPROVEMENTS
PROPOSED ACTION
RENO EIS AREA

ALLOTMENT CATEGORY	IMPROVEMENT [a]	UNITS	COST/UNIT [b] (in dollars)	TOTAL COST [c] (in dollars)
M and C	Maintain Existing Improvements			
I	Fence	105 mi.	7,000	367,500
	Water trough	95 ea.	1,000	47,500
	Spring	8 ea.	1,000	8,000
	Spring box	41 ea.	250	10,250
	Gabion	15 ea.	150	2,250
	Culvert	3 ea.	700	2,100
	Well [d]	1 ea.	10,000	10,000
	Pipeline	2 mi.	5,300	10,600
	Fence Removal	12 mi.	500	6,000
	Cattle Guards	8 ea.	3,000	24,000
	Sagebrush Control and Seeding	6,655 ac.	50 [e]	332,750
TOTAL				$ 821,050

[a] These range improvements and land treatments are designed for multiple use and will benefit livestock, wild horses and wildlife.

[b] Costs per unit were developed by the Division of Operations, Carson City District, and the Division of Technical Services, Nevada State Office, Bureau of Land Management, 1980. These costs were developed at 1980 prices and do not include future maintenance and replacement costs.

[c] Total costs are based on a realistic expectation of monies that will be returned to the district from grazing receipts over a five year period.

[d] Wells differ in depth; therefore, this reflects average unit cost.

[e] Costs shown for sagebrush control are average costs as control methods (prescribed burnings, herbicide application, discing, chaining, or other methods) are not specified by treatment area.

Source: US Department of the Interior, Bureau of Land Management, Carson City District, Unit Resource Analysis, 1980.

Where intensive grazing management systems are implemented, utilization levels may be exceeded during each grazing cycle. The periodic rest from grazing would allow the key management species to increase in vigor and production.

CATEGORY C ALLOTMENTS

Problems - Checkerboard land patterns and wild horse use.

Objectives -

1) With the exception of wild horse use, maintain existing situation through custodial management.

2) Remove wild horses from checkerboard lands.

Management Actions -

Short Term: (0-5 years) -

1) Adjustments in wild horse use would be as shown in Table 1-4. This action would begin to solve the above problems so that the objectives can be met.

2) Continue to monitor to ensure that livestock, wild horse and mule deer use will not result in deterioration of ecological condition and vegetation production or create multiple-use resource conflicts. Grazing decisions would be issued within 12 months after the final EIS is published.

Long Term: (5 year plus) - Similar to Category M.

NO ACTION ALTERNATIVE

Under this alternative the present grazing administration program in the EIS area would continue as it exists at the time the EIS is being prepared. The present level of studies and supervision would continue. Existing livestock and mule deer use would continue at present levels (Table 1-1). Wild horse use would be adjusted as shown in Table 1-4.

Existing range improvements would be maintained, but no new facilities would be constructed.

MAXIMIZATION OF LIVESTOCK ALTERNATIVE

This alternative proposes intensive development of Category I allotments to achieve maximum forage production in favor of livestock. The existing livestock, mule deer and wild horse situation is shown in Table 1-1. As additional vegetation becomes available as a result of grazing systems, range improvements, removal of wild horses and land treatments, future livestock and mule deer use could increase accordingly. Category M & C allotments would be the same as in the Proposed Action.

CATEGORY I ALLOTMENTS

Problems - Similar to the Proposed Action.

Objectives -

1) Maximize forage production in favor of livestock.

2) Manage mule deer habitat for reasonable numbers over the long term.

3) Remove all wild horses.

Management Actions -

Short Term: (0-5 years).

1) Develop range improvements and land treatments identified for livestock (Table 1-5). This action will begin to meet objective 1.

2) Remove all wild horses (Table 1-6). This action will meet objective 3.

3) Implement grazing management systems that will favor livestock production. This action will help to solve problems 3 and 4 as identified in the Proposed Action while helping to meet objective 1 above.

4) Monitor to determine when additional forage becomes available. This action will help to meet objectives 1 and 2.

5) Grazing decisions would be issued within 17 months after the final EIS is published.

Long Term: (5 years plus) -

1) Continue to monitor vegetative production so that livestock and mule deer use can be increased as more vegetation becomes available. This action will help to meet objectives 1 and 2.

2) Develop range improvements for wildlife habitat protection as funds become available (Table 1-5). This action will help to meet objective 2.

RESOURCE PROTECTION ALTERNATIVE

Under this alternative allotments from Category C of the Proposed Action that have potential for im-

TABLE 1-4
WILD HORSE USE AND MANAGEMENT AREAS
PROPOSED ACTION
RENO EIS AREA

AREA		TYPE OF AREA	EST. NUMBERS 1981	EXISTING DEMAND[a] (AUMs)	ADJUSTED DEMAND (AUMs)
Flanigan		HMA			
Sub-Units:	Fish Springs Ranch		359	4,308	4,308
	Tule/Mahog		8	96	96
	Fort Sage		35	420	420
Granite Peak/Dogskin		HUA			
Sub-Units:	Granite Peak		17	204	204
	Dogskin		19	228	228
Pine Nuts		HMA			
Sub-Units:	Pine Nuts		790	7,584 [b]	4,649 [c]
	Buckskins		35	420	420
Pah-Rahs		HUA	772	2,779 [d]	0 [e]
Jumbo		HUA	28	168 [f]	0 [e]
TOTAL			2,063	16,207	10,325

a/ Both Fort Sage and Buckskin have wild horse use outside the EIS area therefore existing demand differs from Table 1-1 by 840 AUMs.
b/ Based on approximately 80% public lands in the herd unit.
c/ Bureau of Land Management has been requested by Bureau of Indian Affairs to remove wild horses from Indian lands in the southern Pine Nuts.
d/ Based on approximately 30% public lands in the herd unit.
e/ Bureau of Land Management is required to remove wild horses from checkerboard land upon request.
f/ Based on approximately 50% public lands in the herd unit.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, Unit Resource Analysis, 1980.

TABLE 1-5
POTENTIAL IMPROVEMENTS
MAXIMIZATION OF LIVESTOCK ALTERNATIVE
RENO EIS AREA

ALLOTMENT CATEGORY	IMPROVEMENT [a]	UNITS	COST/UNIT [b] (in dollars)	TOTAL COST [c] (in dollars)
M and C	Maintain Existing Improvements			
I	Fence	187 mi.	3,500	654,500
	Water trough	95 ea.	500	47,500
	Spring	8 ea.	1,000	8,000
	Spring box	41 ea.	250	10,250
	Gabion	15 ea.	150	2,250
	Culvert	3 ea.	700	2,100
	Well [d]	1 ea.	10,000	10,000
	Pipeline	2 mi.	5,300	10,600
	Fence Removal	12 mi.	500	6,000
	Cattle Guards	8 ea.	3,000	24,000
	Sagebrush Control and Seeding	13,313 ac.	50 [e]	665,650
TOTAL [f]				$ 1,440,950

[a] These range improvements and land treatments are designed for multiple use and will benefit livestock and wildlife. As more funds become available those improvements identified for riparian protection could be developed.

[b] Costs per unit were developed by the Division of Operations, Carson City District, and the Division of Technical Services, Nevada State Office, Bureau of Land Management, 1980. These costs were developed at 1980 prices and do not include future maintenance and replacement cost.

[c] Total costs are based on a realistic expectation of monies that will be returned to the district from grazing receipts over a five year period.

[d] Wells differ in depth; therefore, this reflects average unit cost.

[e] Costs shown for sagebrush control are average costs as control methods (prescribed burnings, herbicide application, discing, chaining, or other methods) are not specified by treatment area.

[f] Increased cost is due to more seedings and fencing.

Source: US Department of the Interior, Bureau of Land Management, Carson City District, Unit Resource Analysis, 1980, and SVIM Inventory, 1979-81.

TABLE 1-6
WILD HORSE REMOVAL SCHEDULE
MAXIMIZATION OF LIVESTOCK ALTERNATIVE
RENO EIS AREA

WILD HORSE AREA	ESTIMATED WILD HORSE NUMBERS TO BE REMOVED[a]	YEAR
Pah Rahs	850	1
Jumbo	35	2
Pine Nuts	1,050	3
Flanigan	525	4
Granite Peak/Dogskins	50	5
TOTAL	2,510	

a/ This reflects an approximate 10 percent annual increase in wild horse numbers.

Source: U.S. Department of the Interior, Carson City District, Management Framework Plan, Step 2, 1981.

provement under intensive management would be added to Category I (Table 1-7A). Category M allotments and the remaining Category C allotments would be the same as in the Proposed Action.

CATEGORY I ALLOTMENTS

Problems -

1) The same problems exist as stated in the Proposed Action.

2) For those new allotments the main concern is checkerboard land patterns (Table 1-7A).

Objectives - as in the Proposed Action plus:

1) Block up checkerboard lands into useable units.

2) Manage mule deer habitat for reasonable numbers (Tables 1-7A and 1-7B).

Management Actions - Actions 1-7 will help solve problems as identified for this alternative and for the Proposed Action Category I allotments so that objectives can be met.

Short Term: (0-5 years) -

1) Propose adjustments in periods-of-use (Table 1-7A and 1-7B).

2) Propose adjustments in livestock use based on utilization studies (Table 1-7B).

3) Propose adjustments in wild horse use (Table 1-7A and 1-7B).

4) Manage mule deer habitat and provide forage for reasonable numbers (Table 1-7A and 1-7B).

5) Develop grazing systems that will help to improve ecological condition (Proposed Action, Category I).

6) Develop range improvements and land treatments as needed for riparian habitat protection and livestock and wild horse management (Table 1-8).

7) Implement AMPs where applicable (Table 1-7B).

8) Implement land exchanges to eliminate checkerboard lands in 11 allotments so that intensive management can be accomplished (Table 1-7A). This action will solve problem 2 above so that objective 1 can be met.

9) Grazing decisions would be issued within 17 months after the final EIS is published.

Long Term: (5 years plus) - Continue to make adjustments in mule deer, livestock and wild horse use based on grazing utilization levels identified through a combination of monitoring, potential of the range to improve under management and inventory information.

STANDARD OPERATING PROCEDURES

INHERENT REQUIREMENTS

Certain requirements are inherent in the implementation of any Bureau action on the public lands. These requirements, or standard operating procedures, are designed to mitigate impacts and would be followed during supervision and construction of range improvements necessary for implementation of alternatives, including the Proposed Action.

1) An environmental review (i.e. environmental assessment) will be prepared before projects are developed except when they are covered by a categorical exclusion so that, depending on impact, modification or abandonment of the project may be considered.

2) Compliance with wilderness directives on proposed projects will be in accordance with Section 603(c) of the Federal Land Policy and Management Act (FLPMA), 1976. This policy provides that until Congress acts on the Bureau's wilderness suitability recommendations for Wilderness Study Areas or on lands still under wilderness review, the existing mining, grazing and mineral leasing activities may continue in the same manner and degree as conducted on October 21, 1976. New or expanded existing uses will be allowed only if the impacts would not impair the area's suitability for designation as wilderness.

Proposed uses and projects will be analyzed on a case by case basis to assure compliance with the Interim Management Policy and Guidelines for Lands Under Wilderness Review, and when applicable, the regulation in 43CFR Part 3800, sub part 3802 titled Exploration and Mining, Wilderness Review Program.

3) Threatened or endangered plant or animal species clearance is required before implementation of any project. Consultation with the Fish and Wildlife Service per Section 7 of the Endangered Species Act is necessary if a threatened or endangered species or their habitat may be impacted.

4) Cultural resource protection requires compliance with Section 106 of the National Historic Preservation Act of 1966, and Section 101(b)(4) of NEPA of 1969. Prior to project approval, intensive (Class III) field inventories will be conducted in specific areas that would be impacted by implementing activities. If cultural or paleontological sites are found, every effort will be made to avoid adverse impacts. However, where that is not possible, the BLM will consult with the State Historic Preserva-

TABLE 1-7A
RESOURCE PROTECTION ALTERNATIVE
ADDITIONAL ALLOTMENTS
RENO EIS AREA

ALLOTMENT [a]	CATEGORY	PROPOSED PERIOD-OF-USE [b]	LAST THREE YEARS AVERAGE USE (AUMs)	MULE DEER REASONABLE NUMBERS[c] (AUMs)	WILD HORSE NUMBERS [d] (AUMs)
Clifton	I	09-01 to 05-31	432	102	531
Hackett Canyon		12-16 to 05-31	Non-use	236	152
Jumbo [e]		06-01 to 09-30	1,320	450	
Kings Canyon		05-15 to 06-14	102		
Plumas Station		05-01 to 10-31	284	557	
Rawe Peak		06-16 to 09-30	236	229	379
Spanish Springs		04-16 to 09-30	809	4	
White Hills		05-01 to 10-31	1,123	273	
Mustang		04-01 to 10-31	300	41	
Olinghouse		04-01 to 10-31	1,403	182	
Duck Hill		06-01 to 09-30	61	14	
TOTAL			6,070	2,088	1,062

[a] These additional allotments that are added into Category I have potential for improvement once checkerboard land patterns are blocked up. They do not necessarily have utilization problems (Appendix L, Section 1).

[b] These turn out dates are for analytical purposes only.

[c] As additional vegetation becomes available over the long term the available AUMs for mule deer could exceed reasonable numbers in a given allotment.

[d] These are estimated numbers.

[e] Includes Gold Hill Allotment.

Source: US Department of the Interior, Bureau of Land Management, Carson City District, Grazing License Files and Unit Resource Analysis, 1980.

TABLE 1-7B
RESOURCE PROTECTION ALTERNATIVE
ORIGINAL ALLOTMENTS
RENO EIS AREA

ALLOTMENT	CATEGORY	PROPOSED PERIOD-OF-USE [a]	LAST THREE YEARS AVERAGE USE (AUMs)	ADJUSTED LIVESTOCK USE [b] (AUMs)	MULE DEER REASONABLE NUMBERS[c] (AUMs)	WILD HORSE NUMBERS [d] (AUMs)
Winnemucca Ranch [e]	I	Year Long	7,503	3,070	2,047	
Flanigan		05-15 to 03-15	5,017	3,306	305	4,308
Churchill Canyon		04-01 to 07-15	2,823	1,622	256	1,214
Pinenut		06-01 to 09-30 11-01 to 11-30	542	0	285	489
Sunrise		05-01 to 09-30	Non-use	Non-use	471	345
Buckeye [f]		03-01 to 11-15	4,550	2,537	345	1,008
Paiute Canyon [g]		05-15 to 03-15	4,511	2,368	1,601	96
Big Canyon		05-15 to 03-15	2,776	1,920	399	
Constantia		05-15 to 11-15	1,036	0	1,439	
Antelope Mountain		05-15 to 11-15	3,103	1,530	2,500	432
TOTAL			31,861	16,353	9,648	7,892

a/ These turn out dates are shown for analytical purposes.
b/ Livestock use is based on existing range utilization study information.
c/ As additional vegetation becomes available over the long term the available AUMs for mule deer could exceed reasonable numbers in a given allotment.
d/ These are estimated numbers.
e/ Includes temporary license. Period-of-use dependent on success of seedings.
f/ Buckeye Allotment includes Fish Springs Allotment.
g/ Paiute Canyon Allotment includes Hungry Valley and Shovel Springs Allotments.

Source: US Department of the Interior, Bureau of Land Management, Carson City District, Grazing License Files and Unit Resource Analysis, 1980.

TABLE 1-8
POTENTIAL IMPROVEMENTS
RESOURCE PROTECTION ALTERNATIVE
RENO EIS AREA

ALLOTMENT CATEGORY	IMPROVEMENT [a]	UNITS	COST/UNIT [b] (in dollars)	TOTAL COST [c] (in dollars)
I	Fence	113 mi.	10,500	395,500
	Water trough	124 ea.	1,500	62,000
	Spring	8 ea.	1,000	8,000
	Spring box	55 ea.	500	13,750
	Gabion	15 ea.	150	2,250
	Culvert	3 ea.	700	2,100
	Well [d]	1 ea.	10,000	10,000
	Pipeline	2 mi.	5,300	10,600
	Fence Removal	12 mi.	500	6,000
	Cattle Guards	8 ea.	3,000	24,000
	Sagebrush Control and Seeding	6,655 ac.	50 [e]	332,750
TOTAL [f]				$ 867,050

[a] These range improvements and land treatments are designed for multiple use and will benefit livestock, wild horses and wildlife.

[b] Costs per unit were developed by the Division of Operations, Carson City District, and the Division of Technical Services, Nevada State Office, Bureau of Land Management, 1980. These costs were developed at 1980 prices and do not include future maintenance and replacement cost.

[c] Total costs are based on a realistic expectation of monies that will be returned to the district from grazing receipts over a five year period.

[d] Wells differ in depth; therefore, this reflects average unit cost.

[e] Costs shown for sagebrush control are average costs as control methods (prescribed burnings, herbicide application, discing, chaining, or other methods) are not specified by treatment area.

[f] Additional cost is different from the Proposed Action due to additional improvements for the new category I allotments.

Source: US Department of the Interior, Bureau of Land Management, Carson City District, Unit Resource Analysis, 1980.

tion Officer and the Advisory Council on Historic Preservation in accordance with the Programmatic Memorandum of Agreement by and between the Bureau and the Council, dated January 14, 1980. This agreement sets forth a procedure for developing appropriate mitigative measures to lessen the impact of adverse effects.

5) Visual resource management requires all actions to be in compliance with BLM Visual Resource Management Design Procedures in BLM Manual 8400. On any project which has a visual contrast rating that exceeds the recommended maximum for the visual class zone in which it is proposed, the visual contrasts are considered significant and mitigating measures must be examined. The ultimate decision in these cases of whether a particular project's visual impact is positive or negative, acceptable or unacceptable, and whether mitigating measures must be implemented, rests with the District Manager and must be made on a project-by-project basis.

6) Areas of Critical Environmental Concern (ACECs) will receive priority designation and protection during the land use planning process per Sections 201 and 202 of FLPMA.

7) A Fire Management Plan will be developed before any prescribed burning occurs.

8) Fence construction must comply with BLM Manual 1737. Lay-down fences will be constructed in wildlife and wild horse areas if necessary and feasible and will have gates installed at least once in every mile and in all corners.

9) Spring developments will be fenced when the need has been identified, to prevent overgrazing and trampling of adjacent vegetation and to provide escape areas for small wildlife. Water will be maintained at the source.

10) Water improvement sites will have bird ramps in watering troughs, lateral watering sites off pipelines, overflows at troughs, and where the need is identified, protection for seep areas.

11) Air quality will be protected as all Bureau and Bureau-authorized activities must be designed to prevent air quality deterioration beyond the established standards specified in the Nevada Ambient Air Quality Standards. The Federal Land Policy and Management Act of 1976 specifies the protection of air and atmospheric quality on BLM lands in Sec. 102 (a)(8), and compliance with state and federal laws in Sec. 202 (c)(8). The Federal Land Policy and Management Act also requires an active role in preventing air quality violations on BLM lands in Sec. 102 (c)(8). The Clean Air Act of 1977 has specific requirements for the federal land managers to protect the air over lands under their jurisdiction.

12) Public Law 92-195, December 15, 1971, "Wild Horse and Burro Protection Act", Sec. 4 requires that wild horses or burros that stray from public lands onto privately owned lands be removed upon the request from the owners.

13) Benefit Cost (B/C) analysis will be performed on improvements required to implement new Allotment Management Plans and other activity plans subsequent to grazing environmental impact statements. Such improvements will be analyzed on an allotment basis. The B/C analysis will be performed in compliance with Bureau policy.

14) Vegetation conversions in sage grouse habitat will conform to procedures specified in the Western States Sage Grouse Guidelines and in coordination with agreement between NDOW and BLM.

MANAGEMENT SUPERVISION PROCEDURES

EVALUATION AND MODIFICATION

With the exception of the No Action alternative, a monitoring and evaluation program to evaluate current and proposed management is inherent in all alternatives, including the proposed action. The program includes resource studies to monitor changes in plant composition and ground cover. At a minimum these studies would monitor actual grazing use, vegetation utilization, range condition and trend, and climatic conditions (BLM Manual 4413.3 and Nevada Range Monitoring Procedures, 1981). Additional studies, if pertinent to the resource values of the allotment, would be implemented to evaluate the effect of the alternatives including the proposed action on wildlife habitat (BLM Manual 6630), riparian vegetation, aquatic habitat, watershed condition and wild horse physical condition.

If evaluation procedures determine that specific allotment objectives are not being achieved, modifications would be made that could include changes in periods-of-use, livestock numbers, management intensity, grazing systems or any combination of revisions in order to attain management objectives. During extraordinary conditions (i.e., drought) the authorized officer would be empowered to make adjustments in grazing use where such adjustments would aid in the attainment of objectives (43 Code of Federal Regulations 4110.3-2(a)(1)).

ADMINISTRATION

Livestock grazing would be administered through the issuance of term permits specifying the allotment, periods-of-use and numbers and kind of livestock. Compliance with the terms of the permit would be monitored year-round. Grazing use beyond the limits of the permitted use and not approved by the BLM would be considered unauthorized use and appropriate action would be taken.

IMPLEMENTATION

COORDINATED RESOURCE MANAGEMENT AND PLANNING

Coordinated Resource Management and Planning (CRMP) is an approach for working with the Bureau's *publics*, primarily before on-the-ground implementation of an activity plan. All of these public users, interest groups, agencies and affected individuals are given an opportunity to work together to develop plans of action within the framework of the Land Use Plan. The result is expected to be a commitment of federal, state, and local agencies, interest groups and individuals to a multiple use coordinated plan to be used as an aid in implementing decisions.

The CRMP process will have its maximum effect following the *Management Framework Plan (MFP)* and occurring prior to, or as part of, activity level planning. Coordinated Resource Management and Planning can provide a strategy for implementing grazing decisions and will serve as an extension of public involvement in the implementation stage. Grazing decisions for Category M, I and C allotments would be issued within 9, 17 and 12 months respectively, after the final EIS is published.

In the case of a grazing EIS, CRMP becomes important during land use decisions and in the implementation stage. The purpose of an EIS is to discuss the environmental impacts of the alternatives including the proposed action. The EIS informs the decision maker of ways to avoid or minimize adverse impacts, or of ways to enhance the environment. It is not a decision document but an informational aid to the decision maker in making land use decisions. It is at the implementation point in the Reno EIS area that the various publics, especially local individuals and groups, have the opportunity to become involved in CRMP.

SELECTIVE MANAGEMENT

To implement any given alternative (excluding No Action) a grazing management program will be proposed for the purpose of improving or maintaining the public land resources through a selective approach to rangeland management. This approach is based on the concept that: (1) an allotment's resource characteristics, management needs, and potential for improvement can be identified and, (2) the timing and intensity of the management actions should be varied according to an allotment's identified needs and potential.

The purpose of the proposed grazing management program is identified by the following general objectives:

1) Authorize livestock grazing of the public rangelands under the principles of multiple use and sustained yield;
2) Protect, maintain, and improve the rangeland resources through sound land use and grazing management decisions;
3) Conduct the level of soil and vegetation inventories necessary to support management decisions and provide a baseline for monitoring programs;
4) Increase and encourage systematic cooperation, consultation and coordination with rangeland users and intermingled landowners as part of the land use and grazing management decision making process;
5) Determine appropriate stocking levels (including proper periods and area-of-use) based on monitoring data, and authorize livestock grazing consistent with those stocking levels;
6) Initiate cost effective rangeland improvements that will help improve the condition of the lands for livestock grazing, wildlife habitat, wild horse and watershed protection, etc.; and
7) Monitor rangeland resources and livestock use to assist in determining proper stocking levels and measure progress toward achieving management objectives.

LEVELS OF GRAZING MANAGEMENT AND IMPLEMENTATION PRIORITY

Ten allotments are proposed for maintenance management (Category M), 10 for improvement management (Category I) and 35 for custodial management (Category C) (Table 1-1 and Appendix K). Actual implementation priority would be established

TABLE 1-9
RECOMMENDED IMPLEMENTATION PRIORITY CATEGORY I ALLOTMENTS RENO EIS AREA

ALLOTMENT	PRIORITY [a]
Winnemucca Ranch	1
Flanigan	2
Churchill Canyon	3
Pinenut	4
Sunrise	5
Buckeye [b]	6
Paiute Canyon [c]	7
Big Canyon	8
Constantia	9
Antelope Mountain	10

[a] For purposes of analysis only. Actual priority will be determined as part of CRMP upon completion of the EIS.

[b] Includes Fish Springs and Jacobsen Allotments.

[c] Includes Hungry Valley and Shovel Springs Allotments.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City Distrit Office, Management Framework Plan, Step 2, 1980.

through CRMP upon completion of the EIS. Among the criteria considered in prioritizing Category I allotments are benefit cost ratio, present vegetation availability and condition, direction of observed trend, erosion susceptability and the severity of the adjustments in vegetation use required to meet the estimated grazing capacity (Table 1-9). Category M and C allotments would not necessarily require prioritization.

RANGE IMPROVEMENTS

Construction of range improvements and vegetation manipulation treatments would be required to implement the grazing management program.

Rangeland improvement projects consisting primarily of fences, water developments and land treatments would be required to improve *ecological condition*, achieve better livestock distribution patterns, wildlife habitat protection, critical watershed protection and to convert potentially suitable rangeland into suitable rangeland.

CHAPTER 2

AFFECTED ENVIRONMENT

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the environmental components which would be affected by the alternatives including the proposed action. In keeping with the directives in Section 1502.15 of the National Environmental Policy Act (NEPA), Regulations for Environmental Impact Statement (EIS), the descriptions presented are brief and commensurate with the anticipated magnitude, duration and intensity of impacts on each component. The material presented includes data only to the extent necessary for the reader to understand the basis for analysis.

Some of the material presented in this chapter was summarized from the Reno Planning Area Analysis (PAA), Unit Resource Analysis (URA), and Management Framework Plan (MFP). These documents are available at the Carson City District office.

SOILS

Soils information for the EIS area is documented in published and unpublished, cooperative third order soil surveys covering South and Central Washoe County, parts of Storey, Lyon and Douglas Counties in Nevada and parts of Sierra, Plumas and Lassen Counties in California (Appendix A). A general summary of chemical and physical properties of the soils in the EIS area is contained in the Soils URA Step 2, along with specific map unit components.

EROSION

The significant erosion problems occur in sensitive riparian habitat areas where there has been a gradual degradation of the vegetal cover (density, composition and vigor) over the years. A probable cause for the decreased vegetal cover and increased erosion rates is overutilization of forage by livestock and wild horses.

Wind erosion also occurs, especially in areas that are devoid of ground cover and are subject to high velocity winds (Watershed URA Step 3, 1980).

Additional information on erosion in specific soils series and/or map units can be made available upon request from the district office.

SEDIMENT YIELD

Sediment is transported by the erosion forces of wind and water. Studies conducted by the *U.S. Geological Survey (USGS)* indicate that generally, the minimum sediment yield which may be transported away from the site under natural conditions would be 0.3 acre feet/square mile/year.

FLOOD AND SEDIMENT DAMAGE

Periodic flooding and associated sediment damage is a common occurrence in the area, especially due to high intensity summer thunderstorms.

About 6,600 acres are flooded annually in the EIS area. Most of the flooding and flood damage occurs on privately owned lands and facilities, however, some of the flood water and the associated damage can be tracked back to deteriorated watersheds on the public lands (Watershed URA Step 3, 1980). Table 2-1 lists seven general areas which are susceptible to flood and sediment damage.

WATER RESOURCES

Approximately 25 percent of the EIS area (Western Hydrographic Region) drains Northwest into the Honey Lake system. Forty percent (Truckee Basin Hydrographic Region) drains Northeast into the Pyramid Lake system, and the rest of the area (Pine Nut - Markleeville Planning Unit) drains into both the Carson Sink and Lahontan Reservoir systems. About 42 percent of the watersheds are on public lands.

TABLE 2-1
FLOOD AND SEDIMENT DAMAGE
RENO EIS AREA

AREA NO.	DAMAGE AREA	TYPE OF DAMAGE	SOURCE AREA PUBLIC & PRIVATE LAND
1	Northwest Reno	Flood & Sediment	Peavine
2	Sun Valley-Sparks	Flood & Sediment	Sun Valley
3	Virginia Foothills	Flood & Sediment	Bailey Canyon
4	Washoe Valley-East	Flood & Sediment	Jumbo Canyon
5	Pyramid Lake	Sediment	Warm Springs Valley
6	Honey Lake Valley	Sediment	Lands in Long Valley Watershed
7	Lower elevations - Pine Nuts, Carson Valley	Flood & Sediment	Buckeye Creek Watershed

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District Office, Watershed URA Step 3, 1980.

WATER QUANTITY

Total EIS area runoff is 140,000 ac. ft./yr. (State of Nevada Water Planning Report, 1971), occurring mostly during the months of March through June. Surface waters that flow through public lands include approximately 10 miles of perennial rivers and streams, 370 springs (60 percent of which are developed), three small lakes and 19 small reservoirs (Water Resource Inventory, 1979). The major surface waters are shown on the Water Quantity Map. The locations of the springs sampled for quality in the EIS area are listed in Appendix B, Section 4.

RIVERS AND STREAMS

There are several *perennial* streams and rivers within the EIS area. These are the East and West Forks of the Carson River, the Carson and Truckee Rivers, Steamboat Creek, Long Valley Creek, Galena Creek, Luther Canyon Creek, Randell Creek, Indian Creek and Pine Nut Creek. Of these, the Truckee and Carson River systems are the most important waterways and are the major sources for commercial, residential and agricultural water for the EIS area (Water Quantity Map).

LAKES AND RESERVOIRS

There are numerous lakes and large reservoirs within the EIS area that are used primarily for fish and wildlife habitat, recreation and some irrigation. These include Jones Canyon, Jumbo Creek, Hardscrabble Creek, Spanish Flat, Eldorado Canyon and Indian Creek Reservoirs, and Stevens, Summit and Curtz Lakes (Watershed URA Step 2, 1980).

WATER USES

Presently, no water is being used for specific watershed activities, e.g., *waterspreading*, watershed irrigation, water structures and water quality maintenance. Total annual consumptive use of water for the EIS area is about 71 ac. ft. with livestock, wildlife and wild horses being the predominant users (Appendix B, Section 2). This figure does not include water used by irrigation systems and the requirements for fire protection. Recreational consumptive use is negligible and no water is drawn from the public land watersheds for municipal use. Non-consumptive use includes any use which does not withdraw water from availability for other uses, such as fisheries habitat and aesthetics. The non-consumptive water use requirement for lakes and reservoirs within the EIS area is estimated to be 1,070 ac. ft./yr. (Watershed URA Step 3, 1980).

WATER QUALITY

In 1979, 60 water sources were sampled in May, July and September to determine the overall water quality in the EIS area (Appendix B, Section 4). The results of the water quality analyses were compared to the State of Nevada's Water Quality Criteria and the Water Quality Standards (Appendix B, Section 3) to determine the water classification of sampled streams and the suitability of water sources for drinking water, wildlife propagation, livestock watering, agricultural use and fisheries habitat (Table 2-2).

All four streams having fisheries potential met the criteria for their classification. The results of the survey show that 83 percent are not suitable for treatable drinking water due to excess *Total Dissolved Solids (TDS)* levels (Watershed URA Step 2, 1980). None of these sources would qualify for drinking water in their natural state. Twenty-eight percent of those sampled for agricultural use exceed TDS levels with sample #12 exceeding the limits for iron. All samples met the suitability requirements for wildlife and livestock watering.

VEGETATION

Two major plant communities, the northern desert and the salt desert shrub communities occur within the EIS area. The northern desert shrub community is characterized by various species of sagebrush and cool season mid-grasses. This type is usually found at elevations greater than 4500 feet on loamier soils nearly free of soil salts. The salt desert shrub community is characterized by *Bailey greasewood*, shadscale, and a combination of cool and warm season mid-grasses. This type is usually found at elevations of less than 4500 feet on soil types with a fairly high concentration of soluble salts. A complete plant list is available in the Range Management URA Step 3, Carson City District Office.

RANGE SITES AND CONDITION CLASSES

Climate, elevation, exposure, slope and soil type combine in varying degrees to define specific

TABLE 2-2
WATER QUALITY SUITABILITY FOR SELECTED BENEFICIAL USES[a/]
RENO EIS AREA

	WATER SOURCE	TREATABLE DRINKING WATER	WILDLIFE PROPAGATION & LIVESTOCK WATERING	AGRICULTURAL	FISHER-IES HABITAT	WATER CLASSIFICATION[b/]
1.	Frandsen Spring	-	+	+		
2.	Mud Spring	-	+	+		
3.	Horse Spring	+	+	+		
4.	Hillside Spring	+	+	+		
5.	Lake Spring	-	+	+		
6.	Willow Spring #2	-	+	-		
7.	Higgins Spring	-	+	-		
8.	Bedell Spring	-	+	+		
9.	Settlemeyer Spring	-	+	+		
10.	Bird Spring	-	+	+		
11.	Juniper Spring	-	+	+		
12.	Double Spring	-	+	-		
13.	Desert Well	-	+	+		
14.	Bull Spring	+	+	+		
15.	Juniper Basin Sp.	-	+	-		
16.	Upper Adobe Springs	-	+	-		
17.	Lower Adobe Springs	-	+	-		
18.	Penny Artesian Well	-	+	+		
19.	Shallow Spring	-	+	-		
20.	Peterson Spring	-	+	-		
21.	Jumbo Creek	-	+	+	+	C
22.	Galena Creek	+	+	+	+	A
23.	Red Rock Creek	-	+	+	+	B
24.	Red Rock Spring #1	-	+	+		
25.	Red Rock Spring #2	-	+	+		
26.	Red Rock Spring #4	-	+	+		
27.	Red Rock Spring #5	-	+	+		
28.	Red Rock Spring #6	-	+	+		
29.	Lower Loam Spring	-	+	+		
30	McKissick Spring	-	+	+		
31.	Badger Spring	-	+	-		
32.	Bull Run Spring	-	+	-		
33.	Hackett Canyon Sp.	-	+	+		
34.	Spring	-	+	+		

35.	Spring	-	+	+		
36.	Mill Canyon Sp. #21	+	+	+		
37.	Spring	-	+	-		
38.	Slater's Mine Spring #1	+	+	+	+	B
39.	Pine Nut Creek	-	+	+		
40.	Mill Canyon Sp. #2	+	+	+		
41.	Pond	-	+	+		
42.	Spring	-	+	+		
43.	Spring	-	+	+		
44.	Spring	-	+	-		
45.	Spring	-	+	-		
46.	Quail Spring	-	+	+		
47.	Powerline Spring	-	+	+		
48.	W. Sunrise Camp Spring	-	+	+		
49.	E. Sunrise Camp Spring	-	+	+		
50.	Twin Spring	-	+	+		
51.	Willow Spring	-	+	-		
52.	Slater's Mine Spring #2	-	+	+		
53.	Winters Mine Spring #1	+	+	+		
54.	Winters Mine Spring #2	-	+	-		
55.	McClellan Spring	+	+	+		
56.	Spring	-	+	-		
57.	Spring	-	+	+		
58.	Spring	-	+	-		
59.	Hercules Mine Sp.	-	+	-		
60.	Spring	-	+	-		

a/ + Suitable
- Not Suitable

b/ Water Quality Criteria are given in Appendix B Section 1.

Note: Only those waters with known fisheries habitat are shown under water classification (see b/

Source: Watershed URA Step 3, 1980.

growth environments which support specific associations of plant species known as range sites. Each range site differs from all other range sites in one or all of the following: (1) kinds of plant species present, (2) relative abundance of the plant species present, and (3) total annual production. The natural expression of the vegetation of a range site, i.e., no modification of the environment by man, typifies a stable *climax* plant association for that site. By comparing the present plant species composition to that of the climax plant association for a particular range site, *ecological condition* may be determined (Appendix D, Section 1).

The EIS area falls within five *Major Land Resource Area* designations as defined by the Soil Conservation Service (SCS). These are: D22, Sierra Nevada Range; D23, Malheur High Plateau; D24, Humboldt Area; D26, Carson Basin and Mountains; and D27, Fallon-Lovelock Area. A number of range sites have been described in each of these Major Land Resource Areas. These sites were developed from documentation of relict site vegetation, interpolation of climax vegetation from similar relict areas, and review of historical records (Appendix E, Section 2, Table 2-1).

A vegetation inventory on 657,898 acres of public land within the EIS area was initiated in 1978 and completed in 1980 (Appendix D, Section 2). A third order soil survey completed by the SCS and the range sites described above were utilized to map *Site Writeup Areas (SWAs)* that were based on vegetation aspect, current vegetation composition, canopy cover, dry weight production, and ecological condition class. The acreage tabulation by range site is summarized in Table 2-1 of Appendix E, Section 2. A total of 11 vegetation types were identified according to the current vegetation aspect into a standard type classification as presented in the BLM SVIM Manual 4412. These types are illustrated on the Vegetation Types Map.

Approximately 45 percent of the public land within the EIS area occurs on range sites having moderately high potential for vegetative production, treatments, and rapid recovery from degradation (Appendix E, Section 2). Thirty-five percent of this area supporting range sites having higher potential is dominated by tree canopy cover which severely limits the opportunity for range site improvement (Appendix C, Section 2, Table 2-1). Analysis shows that 60 percent of public land occurring in high potential range sites is in poor condition (Table 2-3). Given these and other modifying factors (e.g. slopes, rockiness, etc.), the percent of public land having moderate potential for high vegetative production and improvement would be about 15 percent.

Pressures caused in part by improper periods-of-use and overutilization by livestock and wild horses have resulted in site deterioration and poor ecological condition. Natural plant communities have changed radically as those plants that were most palatable to domestic livestock declined in vigor and abundance while less palatable plants increased. Climax species have decreased in the most accessible and heavily used areas leaving remnant plants under the protection of shrubs (Stoddart, Smith and Box, 1975). As reported by Clements (1949) the common sagebrush disclimax has achieved post-climax dominance; a situation that will be maintained by continuous overutilization.

A summary of data by ecological condition class and range site indicates wide variations between acres in each condition class (Table 2-3).

Table 2-4 provides a summary of vegetation condition by allotment. Forage condition classes were determined for the areas where seedings were established in the past. Ecological condition is not listed for these acres because it is felt that a long-lived disclimax exists which cannot be measured by the same parameters as other natural plant associations (Appendix G, Section 1).

RIPARIAN AND ASPEN COMMUNITIES

Riparian and aspen sites are discussed further due to the variety of the plants found there and the fact that these are habitats limited in occurrence and highly attractive to most wildlife, livestock and wild horses.

Two types of riparian sites, D23-25 Wet Meadow 10-20' and D26-03 Wet Meadow 10-14' *precipitation zone (pz)*, occur in the EIS area. These sites are characterized by tufted hairgrass *(Deschampsia caespitosa)*, Nevada bluegrass *(Poa nevadensis)*, sedge *(Carex spp.)*, willow *(Salix spp.)*, and mountain big sagebrush *(Artemisia tridentata vaseyana)*, with a life form ratio of 80 percent grasses, 15 percent forbs and five percent shrubs when in better ecological condition. When condition deteriorates, iris *(Iris missouriensis)*, wooly mules ear *(Wyethia mollis)* and big sagebrush become more dominant. Of the 475 acres of riparian type mapped, 225 acres (47 percent) were in poor condition, 227 acres (48 percent) were in fair condition and 23 acres (five percent) were in good condition. A large percentage of this type is in deteriorated condition due to overutilization by livestock. This conclusion is based on research conducted in adjacent areas and states (Dahlem, 1979, Storch, 1979, Duff, 1979 and Winegar, 1975) and on observations and opin-

TABLE 2-3
ECOLOGICAL RANGE AND FORAGE CONDITION BY RANGE SITE
RENO EIS AREA

RANGE SITE NAME	RANGE SITE NUMBER	GOOD	FAIR	POOR	TOTAL ACRES
Grazable P/J Woodland 16 - 24" pz	22-994	704	3,000		3,704
Aspen Slopes 20 - 24" pz	22-995		41		41
Grazable Jeffrey Pine Woodland 16 - 24" pz	22-997		164		164
Jeffrey Pine Woodland	22-998	116	2,347	94	2,557
White Fir Woodland	22-999		333		333
Loamy 5 - 8" pz	23-04	4,631			4,631
Dry Floodplain 8 - 10" pz	23-05			278	278
Loamy 8 - 10" pz	23-06			1,085	1,085
Sands 8 - 10" pz	23-11		114		114
Stony Loams 12 - 14" pz	23-15	1,520	2,025		3,545
Stony Claypan 12 - 16" pz	23-17		1,011	47	1,058
Loamy 10 - 12" pz	23-20	2,091	13,547	4,692	20,330
Claypan 10 - 14" pz	23-21			1,325	1,325
Wet Meadow 10 - 20" pz	23-25			87	87
Aspen Slopes 12 - 16" pz	23-28	17	60	268	345
Stony South Slopes 10 - 12" pz	23-997	1,289	2,114	1,006	4,409
Claypan 10 - 12" pz	23-998		734	268	1,002
Eroded South Slope 8 - 10" pz	23-999	121		1,296	1,417
Desert Sodic Terrace 6 - 10" pz	24-03		25	227	252
Silty Plain 4 - 12" pz	24-04		2,121		2,121
Moist Floodplain 8 - 10" pz	26-01			45	45
				(8)[a/]	(8)
Wet Sodic Bottom 8 - 10" pz	26-02			400	400
Wet Meadow 10 - 14" pz	26-03	23	227	138	388
Loamy 12 - 14" pz	26-05	3,426	15,080	33,105	51,611
Granitic Uplands 14 - 16" pz	26-06	7	4,486	1,522	6,015
			(713)	(1525)	(2238)
Steep North Slopes 14 - 20" pz	26-07	76	2,430	902	3,408
Granitic Fan 10 - 12" pz	26-08	321	1,908	10,200	12,429
			(110)		(110)
Mahogany Slopes 14 - 18" pz	26-09	1,041	2,437	576	4,054
Loamy 10 - 12" pz	26-10	3,148	23,081	41,858	68,087
		(3114)	(726)	(706)	(4546)
South Slope 8 - 12" pz	26-11		2,292	3,208	5,500
Sodic Terrace 8 - 10" pz	26-12		557	285	842
Sodic Floodplain 8 - 10" pz	26-13			43	43
Dunes 10 - 12" pz	26-14	77	3,849	1,519	5,445
Shallow Loam 10 - 12" pz	26-15	343	13,747	40,651	54,741
				(74)	(74)
Loamy 8 - 10" pz	26-16	14	9,082	18,093	27,189
		(551)	(279)		(830)
Juniper Savannah 10 - 12" pz	26-17	2,317	28,027	21,090	51,434
		(356)	(1155)	(54)	(1565)
Shallow Granitic Upland 10 - 12" pz	26-18	1,508	26,619	11,203	39,330
		(104)	(495)		(599)

TABLE 2-3
ECOLOGICAL RANGE AND FORAGE CONDITION BY RANGE SITE
RENO EIS AREA

RANGE SITE NAME	RANGE SITE NUMBER	GOOD	FAIR	POOR	TOTAL ACRES
Churning Clay 10 - 12" pz	26-19		184	75	259
Sandy 8 - 10" pz	26-20	783	9,704	11,960	22,447
Sodic Flat 5 - 10" pz	26-21		21	552	573
Shallow Stony Loam 8 - 10" pz	26-22		9,096	8,488	17,584
Claypan 10 - 12" pz	26-23	446	11,084	26,109	37,639
		(56)	(126)		(182)
Droughty Loam 6 - 8" pz	26-24	429	3,287	3,112	6,828
Claypan 8 - 10" pz	26-25	2,625	28,677	45,033	76,335
		(189)	(227)		(416)
Granitic Upland 10 - 12" pz	26-26		54	62	116
Churning Clay 8 - 10" pz	26-27		1,448	358	1,806
Mountain Ridges 12 - 16" pz	26-28	614	11,001	1,196	12,811
Eroded Slopes 8 - 12" pz	26-29		7,870	7,205	15,075
Loamy Bottom 8 - 12" pz	26-30			134	134
Loamy 14 - 18" pz	26-38	184	4,574	2,033	6,791
Claypan 12 - 18" pz	26-39		515		515
Upland Browse 12 - 16" pz	26-40	767	333		1,100
Desert Lake Bars 4 - 8" pz	27-979	2,957			2,957
Desert Sands 4 - 8" pz	27-980	801	681	620	2,102
Desert Stony Loam 4 - 8" pz	27-984	7,736	2,922	1,407	12,065
Desert Fans & Terraces 4 - 8" pz	27-988	1,578	568	544	2,690
Sandy Loam 6 - 8" pz	27-989		266		266
Sandy 6 - 8" pz	27-990			24	24
Stony Claypan 6 - 8" pz	27-991	3,708	1,271	23,687	28,666
Stony Claypan 4 - 6" pz	27-994		635	2,308	2,943
Shallow Loam 4 - 6" pz	27-995	260	2,612	1,645	4,517
Stony Loam 4 - 6" pz	27-996		335	677	1,012
Shallow Loam 8 - 10" pz	27-998	33	4,008	827	4,868
Sodic Flat 5 - 8" pz	27-999	5,062			5,062
TOTAL ACRES BY ECOLOGICAL RANGE CONDITION CLASS		50,773	262,604	333,567	646,944
TOTAL ACRES BY FORAGE CONDITION CLASS		4,370	3,831	2,367	10,568
BADLANDS				386	386
TOTAL ACRES		55,143	266,435	336,320	657,898

a/ FC = Forage condition acreage in parentheses.

Note: Public land only for those allotments surveyed between 1978 and 1980.

Source: U.S. Department of the Interior, Bureau or Land Management, Carson City District, SVIM Inventory, 1980.

ions of BLM range conservationists and wildlife biologists.

Aspen occurs in locations with year-round soil moisture (i.e., near streams, springs and snow pockets). Two aspen sites, D22-995 Aspen Slopes and D23-28 Aspen Slopes 12-16' pz were found in the EIS area. These sites are characterized by quaking aspen *(Populus tremuloides)*, snowberry *(Symphoricarpos spp.)*, big sagebrush, Idaho fescue *(Festuca idahoensis)*, mountain brome *(Bromus marginatus)* and a life form ratio of 40 percent grasses, 20 percent forbs and 40 percent shrubs and trees when in better ecological condition. When condition deteriorates, squirreltail *(Sitanion hystrix)*, Great Basin wildrye *(Elymus cinereus)*, wooly mules ear, big sagebrush and rabbitbrush *(Chrysothammus spp.)* increase in dominance in the plant community at the expense of the more desirable climax plant species. Of the 386 acres of aspen type mapped, 268 acres (70 percent) were in poor condition, 101 acres (26 percent) were in fair condition and 17 acres (4 percent) were in good condition. Due to large ungulate (i.e., livestock, wild horses and wildlife) bedding and overgrazing on aspen root sucker reproduction, a large percentage of this type is also in deteriorated condition (Table 2-3).

TREND

While vegetative condition is the current health of the range, trend is the direction in which condition is moving. Upward trend indicates an improving range condition, downward trend indicates deteriorating condition and stable or static trend indicates no discernible change in condition.

Trend studies, using the Photo Plot - Measurement Method outlined in BLM Monitoring Studies Manual 4430, have been established in nearly all allotments within the EIS area, with records going back generally three to five years. Trend may fluctuate from year to year in relation to precipitation received, however, most studies to date have shown downward trend (Table 2-4). Downward trend is indicated on 26 allotments, upward trend on seven allotments and static trend on 14 allotments. The remaining six allotments in the EIS area do not have trend data available. For the purpose of analysis, however, estimated trend based on District Range Conservationists' observation and experience was included in Table 2-4 for those allotments lacking adequate trend records.

SMALL VEGETATION TYPES

There are large expanses of sagebrush and sagebrush/pinyon-juniper throughout the public lands in the EIS area. Intermingled are small patches of vegetation which differ considerably from their surroundings. These vegetation patches, or habitat types, include riparian areas, tree clumps, meadows and waters such as springs and seeps. In total, they amount to less than one percent of the land area, but they are essential to the Great Basin ecosystem because they provide necessary habitat components for 75 percent of the vertebrate wildlife species in the EIS area. Habitat components for all animal species include food, cover (including shade), water and space. One or more of the small habitats may provide an essential component for a wildlife species all year or for only a few months, or may meet all the habitat requirements for a particular species.

Riparian vegetation is defined here to include any vegetation normally associated with standing or flowing surface water, such as willow *(Salix spp.)*, common chokecherry *(Prunus virginiana)*, sedge *(Carex spp.)*, rush *(Juncus spp.)* and rose *(Rosa spp.)*. In addition, tree species such as quaking aspen *(Populus tremuloides)*, Fremont cottonwood *(Populus fremontii)* and black cottonwood *(Populus trichocarpa)* may be considered riparian or simply as tree clumps if no surface water is present.

Conflicts have arisen among animals competing for the same space. Many of the identified habitats have been overutilized by livestock. Of the 382 small habitats mapped and recorded on public lands in the EIS area, 213 or 56 percent have identified conflicts or overutilization (Table 2-5). Identified conflicts were only shown for those habitats which could be protected from continued deterioration by livestock or wild horses. Other habitats which could not be protected but identified as degraded were not included in the table.

Aspen and riparian communities (including springs) are the habitats most noticeably impacted in the EIS area. These areas receive disproportionately heavy use by domestic livestock and wild horses, compared to the surrounding rangeland. The heavy grazing has resulted in aspen shoots being browsed repeatedly, preventing regeneration in many stands.

TABLE 2-4
EXISTING SITUATION
VEGETATION CONDITION AND TREND SUMMARY BY ALLOTMENT
RENO EIS AREA

ALLOTMENT	ECOLOGICAL RANGE CONDITION			FORAGE CONDITION			UNSUITABLE ACRES b/	TOTAL ACRES	TREND
	Good	Fair	Poor	Good	Fair	Poor			
Antelope Mountain	2,392	31,225	22,074				1,624	57,315	STATIC
Bagley Valley	1,770	3,678					320	5,768	DOWN
Barney Riley		1,965					20	1,985	UP
Big Canyon	1,231	2,443	10,103				1,121	14,898	DOWN
Buckeye c/	103	16,001	71,042				38	87,184	DOWN
Carson Plains c/	1,195	2,632	18,752				596	23,175	DOWN
Carter Station		654	477				120	1,251	DOWN
Churchill Canyon	4,733	5,859	30,147				3,288	44,027	DOWN
Clifton	30	696	15,844				6,677	23,247	STATIC
Constantia	284	8,661	9,245	104	827		709	19,830	DOWN
Cottonwood Creek d/ g/	344	2,737	375				128	3,584	STATIC
Diamond Valley d/							0	473	N/A
Double Springs d/ g/		276	442				34	752	STATIC
Dry Lake d/ g/		2,091	777				427	3,295	UP
Duck Hill		1,766	2,768				23	4,557	STATIC
Eldorado			9,609				652	10,261	DOWN
Faye Canyon d/							0	650	DOWN
Flanigan	14,156	26,460	9,498				6,525	56,639	DOWN
Galena Creek g/		1,554	179				116	1,849	STATIC
Hackett Canyon		3,857	2,741				46	6,644	DOWN
Hallelujah Junction g/	49	1,955	2,481	2,957	2,388	1,999	325	12,154	UP
Hangman							0	450	N/A
Hardscrabble	3,912	7,324	209				130	11,575	STATIC
Harvey Flat d/ g/	704	3,575					33	4,312	STATIC
Haskell Peak g/		2,258	736				341	3,335	STATIC
Haypress		1,440					0	1,440	DOWN
Indian Creek		322	1,981				148	2,451	DOWN
Indian Hills		1,032	2,111				0	3,143	UP
Jumbo		10,230	4,999				160	15,389	DOWN
Kings Canyon		996	1,672				20	2,688	DOWN
Koch Ditch d/ g/		282	84				65	431	DOWN
Luther Creek d/							0	270	N/A
Mill Canyon		2,325	13,456				3,283	19,064	DOWN
Millberry Canyon d/							0	1,480	N/A
Mud Lake		1,202	1,536				32	2,770	DOWN

Mustang g/	36	259	7,334				649	8,278	STATIC
Olinghouse	10,089	13,489	4,174				2,750	30,502	DOWN
Pah Rah d/ g/	974	3,530					21	4,525	STATIC
Paiute Canyon c/	3,510	50,616	16,734				2,707	73,567	DOWN
Peavine Mtn. c/ g/		3,133	882				87	4,102	STATIC
Peavine Watershed f/ g/		1,277	1,638				176	3,091	UP
Pine Nut	6	5,447	13,269				657	19,379	DOWN
Plumas Station g/	76	1,911	2,409	1,309	616	368	91	6,780	DOWN
Prison Hill d/ g/		1,903	511				0	2,414	UP
Rawe Peak		887	5,387				374	6,648	DOWN
Sand Canyon	50	110	2,951				477	3,588	DOWN
Spanish Springs g/		101	8,961				427	9,489	STATIC
Spratt Creek d/							0	644	N/A
Sunrise	138	889	15,366				1,411	17,804	STATIC
Wade Valley d/ g/	36	628					26	690	UP
Wedekind e/							0	9,062	N/A
White Hills	1,758	10,004	3,982				890	16,634	DOWN
Winnemucca Ranch	3,197	22,924	16,631				705	43,457	DOWN
TOTAL	50,773	262,604	33,567	4,370	3,831	2,367	38,449	708,990 *	

* Total acres includes acreage for allotments shown on table which have no condition or trend information.

a/ Forage condition classes were determined for areas where seedings were established. Ecological condition is not listed for these acres because it is felt that a long-lived disclimax exists which cannot be measured by the same parameters as other natural plant associations.

b/ Unsuitable acres = rock outcrops and badlands.

c/ Acreage and condition tabulations grouped as recommended in Range MFP Step 2, 1981. Buckeye, Jacobsen and Fish Springs were combined under the Buckeye Allotment. Shovel Springs, Paiute Canyon and Hungry Valley were combined under Paiute Canyon Allotment. Black Springs and Peavine were combined under Peavine Mountain Allotment. Jumbo and Gold Hill were combined under Jumbo Allotment.

d/ No studies established or were not read due to small public land acreage and/or lack of use by livestock for 5 or more years.

e/ No condition information was available.

f/ No trend plots established.

g/ Estimated trend based on District Range Conservationists' observation and experience.

Note: Public land acreage tabulation only; includes 13,029 acres in which no vegetative condition readings were taken (See d/ and e/ above).

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1980.

TABLE 2-5
SMALL VEGETATION TYPES/WILDLIFE HABITATS BY ALLOTMENT
RENO EIS AREA

ALLOTMENT NAME	HABITATS[a/]	CONFLICTS[b/]
Antelope Mountain	14 (10W, 2T, 2M)	12L, 1LH
Bagley Valley	16 (2W, 2M, 12T)	2L
Barney Riley	1W	--
Big Canyon	9W	6L
Buckeye	38 (14W, 4W/M, 11W/T, 1W/R, 6T, 1M)	16L, 1LH, 1H
Carson Plains	2 (1W 1T, 1T)	2L
Churchill Canyon	25 (10W, 7W/T, 5T, 1W/SH, 1W/R, 1M)	9L
Clifton	16 (8W, 5W/T, 1W/M, 1W/T/M, 1SH)	10L
Constantia	11 (10W, 1T)	7L, 2HL
Eldorado	2W	--
Flanigan	23 (9W, 1W/M, 2R,8T, 1M, 2SH)	4L, 6LH
Galena Creek	2 (1W, 1T)	2L
Hackett Canyon	4 (1W, 1T, 1W/R/T, 1W/T)	3L
Hallelujah Junction	9 (4W, 2T, 3SH)	2L
Hardscrabble Creek	9 (3W, 4T, 1R, 1M)	7L
Harvey Flat	3W	--
Haskell Peak	3 (1M, 2T)	2L
Jumbo	10 (6W, 1W/R, 3T)	5L
Mill Canyon	5 (1T, 2W/T, 2W/M)	3L, 1LH
Olinghouse	2 (1W, 1T)	--
Pah Rah	1W	1L
Paiute Canyon[c/] (includes Hungry Valley & Shovel Spgs)	32 (22W, 6W/M, 3T, 1M)	30L
Peavine	8 (2W, 3T, 2W/T, 1W/M)	1L
Pine Nut	42 (13W, 11W/M, 1W/MT, 5M, 9T, 1W/R, 1W/T, 1SH)	11L
Plumas Station	1W	1L
Rawe Peak	12 (6W, 3W/M, 2W/T, 1W/M)	7L
Sunrise	27 (16W, 6W/M, 1W/T, 1T, 2W/M/T, 1M, 1SH)	4L, 5LH, 4H
White Hills	27 (22W, 3W/R, 1M, 1W/M)	14L, 2H
Winnemucca Ranch	29 (19W, 1W/R, 8M, 1T)	11L, 6LH

[a/] W = Water, M = Meadow, T = Tree Clump, SH = Shrub, R = Riparian

[b/] L = Livestock, H = Horses, LH = Livestock and Horses

[c/] Range MFP Step 2 recommended that Paiute Canyon, Hungry Valley and Shovel Springs Allotments be combined and called Paiute Canyon Allotment.

Source: U.S. Department of the Interior, BLM, Carson City District files. Habitat Inventory, 1978 and 1979.

WILDLIFE

A wide diversity of wildlife species inhabit the EIS area. Since vegetative communities vary by type and condition, the wildlife species which occur in one community may vary from another community in abundance as well as diversity.

MULE DEER

Mule deer are the most numerous big game animals in the EIS area (Table 1-1). Following severe declines in the late 1960s deer populations started to increase in 1971. Good overwinter survival (mild winters), good fawn production and a sound harvest program (the implementation of a hunter quota system in 1975) are primarily responsible for current existing numbers. Although populations fluctuate yearly and seasonally, approximately 12,000 deer use the EIS area at some time during the year, mostly in the late fall, winter, or early spring.

There are 18 identified deer winter ranges and 13 summer or yearlong ranges. Nine of the 18 deer winter ranges are key, or critical to the survival of the deer population using them. There is one key summer range and one key yearlong range as shown on the Mule Deer and Sage Grouse Habitat Map. There is no correlation between crucial areas and allotments: nine winter ranges overlap 17 allotments, the key summer range covers portions of seven allotments and the key yearlong range is found on one allotment. In total, 11 key ranges are found on portions of 24 allotments. There is no way to adequately estimate the number of deer using each allotment type, as numbers data for each allotment include not only key ranges but other areas which are used but which are not considered key.

There are several important migration routes, most of them north of Reno, Nevada. A major route crosses U.S. 395 between the Evans Ranch and Hallelujah Junction. The California Department of Transportation constructed three undercrossings specifically for deer passage when U.S. 395 was widened to four lanes in 1975 to 1976. There does not appear to be any problems with deer passage through the fences which cross migration paths, as the deer have learned to use the underpasses and do not try to go through the deer-proof fencing.

Most of the identified deer range, particularly north of Interstate 80, is of greatest value as winter range. There is one major deer herd, the Lassen-Washoe Interstate Deer Herd, which makes use of this winter range. These deer summer in California on U.S. Forest Service and private lands and winter on public lands in the EIS area. This is one of the most studied herds in the west. Tagged twig bitterbrush transects have been read at five year intervals since 1949, deer were trapped and marked for several winters and some of them were radio collared to determine the extent of seasonal movements.

The Bureau and Nevada Department of Wildlife (NDOW) jointly manage the 3100 acre Jacks Valley Wildlife Management Area where the Jacks Valley Interstate Deer Herd winters. The land at the south end of the Pine Nut Range is used as winter range by deer of the Carson Interstate Deer Herd. As with the Lassen-Washoe and Jacks Valley herds, deer summer in the Sierra Nevadas in California and winter in Nevada.

Most winter ranges have good stands of bitterbrush (key deer feed) ranging in vigor from very healthy to decadent. The major problem on all winter ranges is lack of bitterbrush seedling survival. Condition and trend studies on selected deer winter ranges in the EIS area have shown seedling survival to be less than four percent of all bitterbrush plants tallied (USDI, Habitat Inventory, 1980). The next class (young plants) has shown a figure of one half of one percent or less. These small amounts of reproduction and seedling survival will not be enough to sustain the bitterbrush populations. Most of the mature plants in the EIS area are between 90 and 115 years old (Hess, 1977). Bitterbrush seldom lives longer than 140 years (Tueller, 1977).

The quality of spring and summer ranges varies considerably and is characterized by a general deficiency of important *forbs*. Summer ranges, particularly at higher elevations in the Pine Nut Mountains, should be in somewhat better condition than they are because of cooler temperatures and more precipitation. Many factors, including wild fires, contribute to this condition but a primary cause has been overutilization by livestock and wild horses.

Preferred forbs are essential to young mule deer and lactating does because they provide high nutrition and succulence. They are almost non-existent in many places. On many higher meadows in the Pine Nuts, iris has invaded and replaced most of the grasses and forbs. Iris is able to outcompete the preferred vegetation because large herbivores (deer, wild horses and livestock) make little or no use of it.

Aspen reproduction within the EIS area is less than adequate, as most or all aspen suckers are cropped by livestock and wild horses each year. *Understory* vegetation, which provides fawning cover and an important source of succulent forage, is also scarce.

Water does not appear to be a limiting factor on any of the key areas used by deer. Springs are well distributed and are adequate during the summer months. Deer usually eat snow during the winter months.

SAGE GROUSE

Sage grouse populations are found primarily in two locations: the southern end of the Pine Nuts in the Mount Siegel area, and in the Tule Ridge/ Spanish Flat area of the Virginia Range north of Reno. These populations have declined over the past 20 years (Jeffress, 1981).

Four elements are essential for sage grouse to survive and reproduce: strutting grounds, nesting areas, breeding areas and wintering areas (BLM Tech. Supplement 6601-3, 1970). Those areas which have been located to date are identified on the Mule Deer and Sage Grouse Habitat Map.

Courtship and mating occur on strutting grounds of which there are only two of record in the EIS area, one near Bedell Flat Well and the other in the Sand Hills, four miles west of Bedell Flat. These strutting grounds in combination probably support a single population (Jeffress, 1980). Observation of the Bedell Flat strutting grounds by upland game classes from the University of Nevada, Reno, has indicated low use, the high count in 1980 being five males.

Brood rearing begins in the vicinity of nest sites, the majority of which are located within two miles of the strutting grounds. During the first two weeks after hatching, the young grouse depend heavily on insects. Meadows provide concentration areas for insects, and if in good condition have an abundance of succulent forbs, also heavily utilized by the grouse as food (BLM Tech. Supplement 6601-3, 1970). Free water is usually available for use.

Deterioration of habitat, particularly meadows and riparian areas, from overutilization by domestic livestock, wild horses and the improper use of ORVs, is the main factor which has contributed to the decline of sage grouse in the EIS area, in this writers professional opinion. Species composition on meadows is changing; iris and sagebrush are invading and preferred forbs such as dandelion are being lost.

CHUKAR

Chukar is the most important upland game species in the EIS area in terms of the hunting opportunities provided. These birds are an introduced/ exotic species released into the EIS area in the 1940s. Their populations have been typical of other upland game species; after the initial introductions, annual fluctuations related to range conditions, drought, weather, etc., prevail.

Populations are concentrated in the Pine Nut Mountains along the crest, in the area of Mill, Bull and Mineral Canyons (northeast portion of the Pine Nuts), and the Virginia Range north and east of Virginia City. The habitat they use is characterized by low brush, cheatgrass, steep hillsides, rocks and areas of heavy use by domestic sheep and wild horses. Chukar are one of the few wildlife species in the EIS area that thrive on poor ecological conditions. Food is not an apparent problem as chukar utilize a wide variety of grass and forb seeds, depending substantially on cheatgrass.

No particular nesting, brooding or feeding areas have been identified. The only critical portion of their habitat is water. Chukar require free water during the hotter part of the year, usually late June through September. Twenty guzzlers have been constructed in the area of Mill, Bull and Mineral Canyons since 1970 by BLM and NDOW to provide water in these areas.

NONGAME BIRDS

There are more than 150 nongame bird species represented in the EIS area. Their distribution (as a group) is areawide, since every vegetation type or its variations provide habitat for at least one species. The most productive of the small vegetation types/habitats is an aspen overstory with grass/ grass-like/forb understory, surrounded by sagebrush or sagebrush with scattered pinyon and juniper. Forty nine species of birds were documented by habitat inventory crews in the EIS area in 1978 and 1979 in this habitat type. The second most productive habitat is an aspen overstory with a rose/ willow understory, with 46 species of nongame birds inventoried. The third largest number of nongame bird species was recorded in curlleaf mountain mahogany types. The key element here is structural diversity of vegetation. Vegetation containing a variety of structural diversity such as shrubs and short and tall trees (as in the case of aspen and cottonwood groves, and willows) attracts many more bird species than vegetation lacking in structural diversity such as a stand of big or low sagebrush. Relatively few birds are attracted to sagebrush, yet many are attracted to a combination of aspen and willows, or aspen and willows and sagebrush, for example. This has been well documented by Thomas (1979). The difference between similar habitat types, one wet and one dry, was surprising. A dry willow/rose site surrounded by big sagebrush supported only four bird species, while the same type of site with surface water supported 24 species. This same phenomenon was also noted in a sedge/grass site surrounded by pinyon and juniper; the wet type had 32 species, the dry site none. The above data supports two concepts: the importance of vegetative structural diversity, and the importance of surface water.

Nineteen species of raptors are known or suspected to occur in the EIS area. Data is limited regarding relative abundance, which is dependent upon the season of the year and the prey base. Cover, including nest sites, is very important. Cottonwood and aspen stands provide important nesting habitat for many raptors, particularly owls, red-tailed hawks, *kestrels*, Cooper's hawks and goshawks (USDI, Habitat Inventory 1978).

WILD HORSES

Wild horses are presently found in five *Herd Use Areas (HUAs)* within the EIS area (Grazing Allotment and Wild Horse Use Area Map). There are no wild burros in the EIS area.

Two use areas are in a checkerboard land pattern and one use area contains a large block of private Indian lands. Two other use areas and their sub-units are in areas that have little or no private land. Major obstacles (e.g. fences, physical barriers) generally prevent movement between HUAs.

The data on wild horse populations, yearly increases and birth and death rates are inexact and should be considered as estimates only. The University of Minnesota is presently doing a study on populations by aerial census using radio collared and uncollared animals. The studies are in the Pah Rah HUA and the Pine Nut HUA. Preliminary findings are showing that aerial census counts underestimate population numbers by 10 to 15 percent in the open terrain areas, and 30 to 40 percent in the rougher, more timbered areas. The rate of herd increase varies by area and nutrition, but appears to average around 10 percent annually.

Historically, horse numbers prior to 1971 fluctuated with market demands, and at times greatly exceeded the present estimates.

RECREATION

There is a wide diversity of interests among recreation users in the EIS area. Vehicle dependent recreation activities accounted for 220,000 *visitor days* in 1980. Non-vehicle related activities, such as horseback riding and hiking, accounted for 118,000 visitor days during the same year.

The best opportunities for non-vehicle types of recreation occur at the primitive and semi-primitive end of the *recreation opportunity spectrum (ROS)*. However, use of the public lands in the EIS area is shifting towards the more urban type of recreation experience. There continues to be a high demand for development of public lands for such things as access roads, mining, powerlines, pipelines, communications sites, woodcutting, etc. Roads, vehicle trails and developments occur throughout much of the EIS area's landscape. No primitive areas were identified in the EIS area and only 15 percent of the area is presently classified as semi-primitive non-motorized. The semi-primitive non-motorized class identifies relatively unmodified natural landscapes of moderate size that do not presently have vehicle access (Appendix J). The majority of the semi-primitive non-motorized opportunities on public land are found in the Virginia Mountains (Tule Ridge), Petersen Mountain, Eldorado Canyon, the higher elevations in the Pine Nut Mountains and along the East Fork of the Carson River. These areas are identified on the Visual Resource Management and Recreation Opportunity Map.

Riparian habitat, including aspen, plays an important role in providing recreation opportunity. Recreationists are attracted to riparian features because they provide shade, shelter, an opportunity to view or hunt wildlife and are a pleasant scenic contrast to the surrounding desert. The greatest potential for conflict between recreationists, wildlife and grazing occurs in these riparian areas.

The EIS area contains a variety of scenery which has been classified into four Visual Resource Management (VRM) classes (Appendix I) following the guidelines in BLM Manual 8400. These classes are based on factors such as scenic variety, the public's concern or sensitivity, and the distance the area is most likely to be viewed from (Visual Resource Management and Recreation Opportunity Map).

LIVESTOCK GRAZING

Presently there are 59 grazing allotments in the EIS area (Grazing Allotment and Wild Horse Use Area Map). The allotments are comprised of intermingled private and public lands. Most of the allotment boundaries are fenced and some allotments have cross fencing to form pasture units. The majority of range improvements are on public lands and are covered by either a *Section 4 permit* or a cooperative agreement. Livestock have harvested an average of 44,000 *animal unit months (AUMs)* of available vegetation annually over the past three years.

KIND OF OPERATION

There are six sheep permittees with *grazing preference* on 17 allotments and 37 cattle permittees with preference on the remaining allotments. Most of the ranches using public lands in the EIS area are cow-calf operations. Calves are born in the spring and are sold as stockers-feeders in the fall. Calf crops generally range from 72 to 82 percent (Nevada Crop & Livestock Reporting Service, UNR 1981), although a study for the 1976 period showed a calf crop of 68 percent. This could well be due to the drought situation that occurred during the survey period (Nevada Department of Agriculture 1978). Prior to 1972 calf crops were about 81 percent for the area (Mitchell and Garrett, 1977). The average calf crop for the rest of the United States is about 78 percent (USDA, 1980).

Most of the cattle herds are Hereford, Angus or Brangus, however crossbreeding with various exotic breeds also occurs. The majority of the herds are of commercial quality bred to registered or purebred bulls.

Only one sheep permittee lambs on the range, the rest shed lamb. Lamb crops are about 115 percent (Nevada Crop & Livestock Reporting Service, UNR 1981). Twinning by ewes is quite normal and increases as nutrition needs are met (Morrison, 1961).

Some major problems affecting livestock production in the EIS area are drought, livestock distribution, vandalism and ecological condition of the range.

Drought periods and times of low forage production are normal for the EIS area due to the Sierra Nevada *rain shadow effect*. The exception to this is the Markleeville Unit and the higher elevations at the south end of the Pine Nuts. Drought influences many characteristics of rangeland vegetation such as vigor, production, composition, cover and plant mortality. District studies and photo plots show as much as 200 percent variation in plant production of ungrazed plots due to variations in weather. A reduction of desirable forage species and a reduction in forage production affects livestock production. Conception and weaning rates drop, sale of breeding stock may have to occur and an increase of supplemental feed may be required (Wallace and Forester, 1975).

Livestock distribution is another problem. In this climate, water for stock is a major requirement. Improved distribution can be accomplished by fencing and water development. District utilization studies and resultant utilization maps show that many allotments could have adequate forage, but have poor distribution of livestock. Areas that receive light grazing or none at all would likely become more suitable by development of water such as stock tanks, wells and pipelines.

Vandalism is a major problem in the EIS area. As yearly vandalism increases, more water troughs are being destroyed, fences cut and livestock shot or stolen. This vandalism costs both the livestock permittee and the Bureau money. Windmills have had to be removed and submersible pumps installed. Vandalism resistant water troughs and float valves have had to be installed.

SOCIAL AND ECONOMIC CONDITIONS

The EIS area consists of parts of eight counties in Nevada and California. Since most social and economic data are available only on a county-wide basis, it has been determined that only the six most affected counties will be included in the social economic impact region for this analysis. These counties are: Lyon, Douglas, Storey, Carson City and Washoe in Nevada, and Alpine in California. The great majority of affected ranchers (85 percent), as well as most public land acreage (96 percent) and affected communities are located in this region. Counties with public land acreage not included in this analysis are Plumas and Lassen in California.

REGIONAL ECONOMIC CONDITIONS

One of the EIS area's most distinguishing characteristics has been its rapid population growth. The population increased 72 percent from 153,000 in 1970 to 262,000 in 1980, which makes it one of the fastest growing regions in the nation. This growth has been spurred by the rapid expansion of the gaming/tourism industry in Reno. Growth has slowed considerably since 1979, because of the effects of gasoline price increases and recession on the gaming/tourism and construction industries. Nevertheless, the region's population is expected to reach 360,000 by 1990, a 38 percent increase over the 1980 level (Nevada State Planning Coordinators Office, 1980).

The urban areas of Reno and Sparks contain about three fourths of the region's population (189,000). With the exception of Carson City (pop. 32,000), the rest of the region is primarily rural. The rural areas have been strongly affected by growth in the urban areas. This is particularly true in Carson Valley which has been absorbing spillover growth from Lake Tahoe and Carson City, and the region north of Reno which is rapidly developing into a suburban area.

The region has one of the highest per capita incomes in the nation at $11,700 (1979), well above the national level of $8,800 and the Nevada State level of $10,500 (US Dept of Commerce, 1981). Total labor and proprietors income in the region was about $2.2 billion in 1979 (Table 2-6). About one fourth of this was directly related to the gaming/tourism industry. Rural area income totaled about $170 million (Appendix L, Section 6).

Unemployment rates have generally been low in the EIS area. In March, 1981, the region's rate was 5.7 percent as compared to 7.0 percent for Nevada and 7.3 percent for the nation (Nevada Employment Security, 1981). Total employment in the Reno region for 1979 was 151,000. Of this total about 44,000 were employed in gaming related occupations, about 29 percent of total employment (Nevada Employment Security, 1981). The only other sectors with more than ten percent of the region's employment are retail trade (15 percent) and state and local government (13 percent). The region serves as a retail trade center for much of northern Nevada and northeastern California. Much of the state and local government employment is located in the State Capitol at Carson City.

A major characteristic of the region's economic structure is the heavy reliance on one industry - gaming. Small changes in the industry have significant effects on the entire economy of the region.

RANCH ECONOMICS

RANCHING INDUSTRY

Livestock have been using about 44,000 *AUMs* of public land forage in the EIS area. This accounts for about five percent of the total forage requirements of the six county region, excluding public land forage not in the EIS area. Of the 350 livestock ranches in the region (U.S. Dept. of Commerce, 1980), 33 have been using public land allotments in the EIS area. Another ten ranches with grazing privileges have not been using their allotments. The average dependency on public land of the active ranches has been about 20 percent of the total forage requirements. The Bureau in effect also controls grazing on many intermingled parcels of private range because fencing costs are prohibitive. These lands account for about 19,000 AUMs of active use. Therefore, the total public plus "tied" private AUMs has been about 63,000 or 30 percent of the ranches' forage requirements. Dependency on public lands is generally much higher during the summer grazing season.

The public land ranches have been categorized into four types in order to provide a more detailed analysis. These types are: (1) cattle operations on public lands yearlong (five ranches), (2) cattle operations on public lands primarily during the summer with greater than ten percent dependency (11 ranches), (3) cattle operations on public lands primarily during the summer with less than ten percent dependency (12 ranches), and (4) sheep ranches (five ranches).

Ranch budgets, production, and resource statistics were developed for "typical" ranches for each category (Appendix L, Section 4, Tables 4-1, 4-2). Linear programming (LP) models of each typical ranch were developed in order to estimate impacts (Appendix L, Section 3). The information used to develop the models was obtained from local ranchers, livestock industry consultants, Cooperative Extension agents, the Economics and Statistics Service of the Department of Agriculture, and BLM operator files.

Although each individual ranch has its own characteristics and may vary significantly from other ranches, it is felt that the "typical" ranches used in this analysis adequately represent the majority of ranches in their category for the purposes of this EIS. Data on individual ranches are displayed in Table 2-7. As the table indicates, herd size varies from less than 100 head to greater than 1000 head. Public land forage is distributed unequally among the ranches. In fact, the five ranches with

TABLE 2-6
INCOME AND EMPLOYMENT [a]
RENO EIS AREA
1979

SECTOR	EMPLOYMENT [c]	PERCENT OF TOTAL	INCOME [d]	PERCENT OF TOTAL
Farm	1,000 [e]	0.7	$ 16,000,000	0.7
Ag Services, Forest, Fish	500	0.3	8,000,000	0.4
Mining	1,100	0.7	21,000,000	0.9
Construction	10,400	7	237,000,000	11
Manufacturing	11,500	8	186,000,000	8
Transportation and Public Utilities	8,900	6	189,000,000	9
Wholesale Trade	6,100	4	107,000,000	5
Retail Trade	22,700	15	249,000,000	11
Finance, Insurance, and Real Estate	7,000	5	121,000,000	5
Gaming/Tourism [b]	43,700	29	558,000,000	25
Other Services	14,600	10	186,000,000	8
Federal Government	4,400	3	68,000,000	3
State and Local Government	19,200	13	265,000,000	12
TOTAL	151,100		2,211,000,000	
Proprietors	9,200			
TOTAL	160,300			

[a] Data for Alpine, Carson City, Douglas, Lyon, Storey, and Washoe Counties.
[b] Estimate calculated by BLM, Carson City, from unpublished Nevada Employment Security Department data, 1980.
[c] Alpine County employment figures are for 1978.
[d] Labor and proprietors income.
[e] Includes farm proprietors.

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis, Regional Economics Information System, April, 1981.

TABLE 2-7
RANCH CHARACTERISTICS
RENO EIS AREA
1979

TYPE RANCH	HERD SIZE	PUBLIC LAND FORAGE (AUMs)		AVERAGE DEPENDENCY ON PUBLIC LAND FORAGE
		Active Preference	Licensed Use	(percent)
Cattle: Year Long				
La Rue	>1,000	6,942	7,503 [a]	50 - 75
Fish Springs	500 - 1,000	5,062	5,017	50 - 75
Intermountain	250 - 500	4,934	4,511	>75
Capurro, Joe	250 - 500	2,873	2,599	25 - 50
De Paoli	500 - 1,000	1,766	1,769 [a]	25 - 50
Cattle: Summer Use High Dependency				
Lucky Hereford	500 - 1,000	8,447	3,103	25 - 50
Saralegui	250 - 500	1,176	1,180 [a]	25 - 50
Boegle	100 - 250	1,277	1,182	50 - 75
Knox	500 - 1,000	1,246	1,036	10 - 25
Gaspari	100 - 250	428	529 [a]	25 - 50
Opplo	100 - 250	429	580 [a]	10 - 25
Garaventa	<100	596	596	25 - 50
Evans	250 - 500	429	429	10 - 25
Cantion	<100	330	348 [a]	25 - 50
Capurro, Herb	<100	300	300	50 - 75
Urrutia	100 - 250	404	161	10 - 25
Cattle: Summer Use Low Dependency				
Dangberg	>1,000	1,731	773	<10
Rolling "A"	500 - 1,000	1,324	432	<10
Dressler	>1,000	251	251	<10
Springmeyer	250 - 500	235	234	<10
Park	>1,000	219	219	<10
Need More	250 - 500	193	192	<10
Smith	250 - 500	300	105	<10
Bacon	500 - 1,000	220	147	<10
Hall	500 - 1,000	60	60	<10
Callahan	<100	29	29	<10
Chaves	100 - 250	26	20	<10
Gansberg	500 - 1,000	40	16	<10
Sheep				
Buckeye	2,500 - 5,000	5,159	4,675	25 - 50
Sario	>5,000	5,394	3,059	10 - 25
Borda	2,500 - 5,000	4,010	1,370	25 - 50
Laborde	2,500 - 5,000	939	841	<10
Hoffman	2,500 - 5,000	300	707 [a]	10 - 25
Inactive				
Fulstone		750	0	
Anderson		250	0	
Winters		204	0	
Ricci		374	0	
Monte Cristo		205	0	
Wilcox		202	0	
Goni		731	Leased to Laborde	
Stewart		150	0	
List		72	0	
Hiedenrich		96	0	
Total		60,103	43,973	20

[a] Includes temporary non-renewable use or Exchange of Use.

Source: US Department of the Interior, Bureau of Land Management, Carson City District Office, Operator Files, 1979.

the most use accounted for more than half of the total public land forage use.

Most of the ranches are cow-calf operations. Calves are generally born in the spring and sold as feeders in the late fall weighing 375 to 450 pounds. Cattle are generally moved to public lands in May and are grazed there until September or October. Some ranches also have cattle on private pastures or Forest Service lands during this period. In the late fall most cattle graze on hay aftermath or private pastures. Hay is the main source of feed from mid-December through April or May. Sheep operations follow a similar pattern. Since hay is generally the most expensive source of feed used, a key to the profitability of the ranches is the length of the hay feeding season.

As indicated in Table 2-8 all ranch classes were able to cover fixed and variable costs. This income represents money available to make payments on long term (real estate) loans and provide the rancher a return for labor and investment. Sheep ranches were the most profitable on a per ranch basis. Total receipts from livestock sales amounted to about $4 million. Total net labor and proprietors income from all of the ranches was about $1.6 million. This represents ten percent of total farm income, 0.07 percent of total regional income, and 0.9 percent of total rural area income. It should be noted that the income figures do not include payments on real estate loans. The existence of such loans is probably the most significant single factor in determining the profitability of a ranch. Data from the District's operator files indicate that eight ranchers have mortgages which include their grazing privileges as collateral. Of these, the average loan was initiated in 1974 for $235,000. Assuming a 25 year loan at 11 percent, the annual payment would amount to about $25,000 - a significant portion of the typical ranches' income ($20,000 to $57,000).

None of the typical ranches were able to make a positive return when opportunity costs are included. These are non cash costs and consist of returns to operator labor and investment. The negative returns indicate that the operator's resources (e.g. capital and labor) could earn greater returns in other industries (Appendix L, Section 3).

It should also be noted that the budgets do not include any adjustments to reflect the fact that ranch property has been appreciating at a rate of about ten percent per year in Nevada (USDA, 1980), or that some individuals can obtain substantial tax benefits from owning a ranch (Briemyer et al, 1974). These factors can be critical in determining the viability of a ranch operation.

Ranch property has been appreciating rapidly in the EIS area partly because there has been considerable pressure for conversion to subdivisions and has particularly affected two of the largest public land ranches. Both the Dangberg and Lucky Hereford ranches have sold substantial portions of their property for subdivision development.

Another significant characteristic of ranches in the EIS area is turnover; full or partial transfer of public land base property occurred eighteen times between 1975 and 1978 as indicated by files in the Carson City District. This represents a ten percent annual turnover rate, much higher than the average four percent rate for the mountain states (USDA, 1980).

On a regional basis, public land grazing contributes not only to livestock sector income, but also, through the multiplier effect, to other sectors of the region's economy. For the Reno economic region, as specified by the Bureau of Economic Analysis, the multiplier for livestock earnings is 2.4 (U.S. Water Resources Council, 1977). Therefore, the total labor and proprietors income derived from the public land ranches was about $3.9 million or 0.2 percent of total regional income.

Total employment on the 33 public land ranches during 1979 was about 125 including proprietors (wages calculated at $2.72 per hour (Nevada Crop and Livestock Reporting Service, 1980)). Employment is also subject to the multiplier effect. Total direct and indirect employment from production by the ranches totaled about 290 in 1979 or 0.2 percent of regional employment.

The ranchers have no legal property rights to grazing preferences on public lands since the lands are owned by the public, but the preferences do have a *de facto* market value. This value is a result of the fact that ranchers have historically been deriving benefits greater than the grazing fees paid to the public for the use of public lands (Nielson & Workman, 1971). In the EIS area, public land allotments have a value of about $40 per AUM. The total value of the 85,000 AUMs of active public land preference and "tied" private land AUMs is about $3.4 million. This value is currently being affected by BLM's process of adjusting fees to market value as required by law. The value may also be affected by the continuing uncertainty regarding forage use recommendations which could come from the CRMP process.

WILDLIFE ECONOMICS

Wildlife related recreation on public lands also contributes to the regional economy. Due to lack of data the full contribution of wildlife to the economy of the EIS area cannot be estimated. Expenditures for hunting mule deer (the most significantly impact-

TABLE 2-8
SUMMARY OF RANCH BUDGET AND DEPENDENCY DATA
RENO EIS AREA

	Cattle Year Long	Cattle Summer Use High Dependency	Cattle Summer Use Low Dependency	Sheep
Dependency				
Herd Size (Cows/Ewes)	670	250	475	3,900
Total AUMs Required	10,600	3,700	8,000	11,000
Public Land AUMs	4,300	860	200	2,130
Dependency on Public Land Forage	41%	24%	3%	19%
Budget				
Gross Income	$ 144,000	$ 59,000	$ 129,000	$ 224,000
Variable Costs	87,000	29,000	72,000	141,000
Fixed Costs a/	22,000	10,000	20,000	26,000
Net Ranch Proprietors Income *	34,000	20,000	38,000	57,000
Net Labor and Proprietors Earnings	55,000	25,000	49,000	101,000
Opportunity Costs b/	146,000	79,000	159,000	210,000
Return (Loss) to All Factors *	(112,000)	(59,000)	(121,000)	(153,000)

* Totals may not add due to rounding.

a/ Does not include payments on real estate loans.

b/ Includes returns for family labor and investment. This does not represent actual cash expenditures. It is only a theoretical charge that represents returns which could be earned if capital and labor were invested in other industries. This is not adjusted for real estate appreciation (ESCS, July, 1980).

Source: US Department of the Interior, Bureau of Land Management, Carson City District Office, 1981. (For methodology refer to Appendix M, Section 5).

ed species) on EIS area public lands were estimated to be about $85,000 in 1979. From these expenditures regional income (including the multiplier effect) totalled about $40,000 (Appendix L, Section 5). This is less than 0.002 percent of the region's income. It should be noted that additional income is derived from non-consumptive use (sightseeing, etc.) of mule deer as well as use of other species.

SOCIAL CONDITIONS

Information in the following sections was obtained through informal interviews and observations (Appendix M, Section 2).

Sociologically the EIS area can be described in terms of its complexity. This is manifest in the widely divergent preferences for lifestyles of the area residents. There is an urban-rural dichotomy evident, most obvious in the choice of economic pursuits.

This dichotomy is defined by cultural models of behavior and growth. As stated above, three-fourths of the area's population falls into the urban sector. Urban populations relate to the gaming industry, trade, support industries and government workers. Their attitudes and values are deeply affected by philosophical preferences. The stereotype profession is that of the traditional cowboy-rancher, most often viewed as a rugged individualist and symbol of the pioneer west.

Rural or semi-rural suburban lands are highly valued because in this setting one is removed from the commercial and industrial centers. The impersonal, complex pressures of urban life are diminished or disappear entirely in rural settings.

LIVESTOCK COMMUNITY

LIFESTYLE

All persons interviewed who were involved with ranching considered their operation to be a business, albeit a non-lucrative one. In the EIS area there is a significant number of permittees who are "weekend ranchers"; these individuals have a law or medical practice, or hold some other position within the urban center, and return to ranching on weekends. Ten ranchers have a *non-use* grazing status on the public lands.

Fulltime permittees point to inflation's effects on equipment costs, fuel and feed, drought conditions, vegetation allocation problems, transportation costs and low beef prices as causes of their economic instability. They find it difficult to "break even" under these conditions.

They say that they remain in the ranching business for varied reasons. Some report that it has always been their way of life, and they have no desire to enter other occupations. This attitude seems typical of those from a ranching background. Others sought a change from another type of work and found ranching agreeable. Yet others feel that ranching offers an escape from the frantically paced urban way of life. They seek the quieter rural atmosphere.

When asked about their reasons for remaining in the livestock industry, all responded by mentioning that it is a good lifestyle, the non-monetary aspects outweighing the drawbacks. Independence, self-reliance, individualism, working close to animals and nature and the family rewards are the most often voiced as positive attributes connected with ranching.

This lifestyle is considered most beneficial to the family. The rural atmosphere and family cooperation required by the operation is thought to be highly conducive to the retention of the family unit. Responsibility and self-confidence are developed early. Children spend more time within the family, both working and in recreational pursuits. Delinquency and crimes are said to be less common.

The women are very involved in the ranching business. In addition to the traditional female roles (wife, mother, homemaker), they fulfill others such as bookkeeper, veterinary aid, hay mower or stacker, etc. In this respect, they have attained an equal status with their male counterparts. In fact, some ranches are owned and operated by women.

ATTITUDES

All permittees interviewed voiced the opinion that livestock is a productive use and should therefore be the dominant use of public lands. This idea is based in part, on the historic use pattern of the public rangelands. Permittees stress their economic dependence on public lands based on the available forage, indicating they would be in economic straits if present use was in any way curtailed.

Most permittees admitted that at one time the land had been overgrazed, but due to present management practices by the permittees, the condition of the range has improved. None believed that individual allotments were presently overgrazed or in very poor condition, but some areas were reported in better condition than others. The permittees find fault with any data or inventories which indicate overuse that might lead to proposed livestock reductions or changes in periods-of-use.

Opinions on BLM management vary markedly. A few express a sympathetic view that the agency is making the best of a bad assignment. Others have nothing positive to say. Inconsistency in policy and action is a frequently cited discontent.

The majority of permittees have very negative attitudes toward wild horses. They believe that wild horses are the major cause of any degradation of the range and should be dealt with accordingly. They contend that the environmentalists and protectionists do not have a true conception of the problems facing the permittee. The preservationist public lacks an awareness of the forage conflicts and range damage generated by wild horses. Although the permittees admit to being horse lovers, they say the wild horse has no productive use. As such, the horses should either be removed from public lands, or drastically reduced in numbers.

Permittees tend to feel that there is less of a conflict between livestock and wildlife. An appreciation for wildlife resources (mainly deer, antelope, and birds) is reported; they have no use for predators. They do maintain that managing agencies give too much consideration to wildlife, and in so doing, economically distress the permittees. Wildlife is especially thought of as an impediment to range improvements.

Even though most permittees are hunters themselves, they do not hold a very high opinion of sportsmen as a group. They report hunters to be largely rude and irresponsible. They find their gates left open, fences cut, posts burned, structures perforated by indiscriminate plinking and litter as well as other evidences of theft and vandalism. Permittees would like tighter control over this situation.

Similar problems are reported by the ranching community with respect to off-road vehicle groups and general weekend recreationists.

REGIONAL

Residents in the EIS area feel that the major force underlying the economic structure is the gaming industry. The cultural and social significance attributed to this industry is not always positive, however. The ranching lifestyle, on the other hand, is valued for its traditional and historical contributions to the development of the State. Also, since there are many "weekend ranchers" who hold responsible positions within the urban populations, the livestock industry is sympathetically viewed by the area residents.

Hunting, camping, hiking, river rafting, ORV use, horseback riding and general sightseeing are among the area residents' most popular activities and are attributed a very high value. These types of activities attract a significant number of people from neighboring states, who are welcomed by area residents. This immigration of activity hinges on the attractions of the gaming industry as well. Access to the public lands for recreation purposes is a frequently raised concern of the urban populations (Nevada State Legislative Council Bureau, 1980).

There is a general resentment toward any government agency, the preponderence of regulations and excessive paperwork being the most frequently cited reason. Environmental legislation is thought to be the underlying cause of the volume of red tape.

STATE AND NATIONAL

Several state and national interest groups have expressed concern about the management of the EIS area. Most focus on the need for assurance that the BLM will adhere to its multiple-use policy in practice. All environmentalist and protectionist groups fear that there will be a slippage into single-use management.

The wildlife representatives contacted are committed to the maintenance and enhancement of wildlife resources. The groups they represent are primarily composed of professionals employed in a wildlife management capacity within the State of Nevada. They contend that past and present vegetation allocations identify the inequities in resource management. This "skewed perspective of historical use" gives priority to the livestock industry in a manner unacceptable to the management objectives of wildlife groups (Molini, 1981). They feel that overuse of the public lands, especially by the livestock industry, has seriously degraded the fragile environment of the area. Riparian habitats are emphasized as being in immediate need of improvement and protection. It has been suggested that past BLM decisions have not favored the multiple-use management of riparian habitats, but have instead promoted their elimination.

These groups favor a reduction in numbers of wild horses which they believe will help check degradation of the range. Range improvements should be designed to benefit wildlife resources as well.

Wildlife groups believe preservation of wildlife resources is most important. The urban populations present the greatest potential for non-consumptive use (aesthetic appreciation) of wildlife resources, but create a greater stress factor in the animals themselves (e.g. from ORV use). While these groups admit that management is difficult in this situation, they expect to see BLM multiple-use decisions that will reduce the conflicts between wildlife, the livestock industry and wild horses, and result in habitat improvements.

Organizations which emphasize preservation of environmental quality of the public lands have recently become quite vocal in their efforts. They have expressed the concern that the BLM policies do not adhere to the letter of environmental law (NEPA and CEQ guidelines). They vehemently protest any suspected nonequitable allocation of land use. The environmental groups would not grant the livestock industry priority over other resources. They are concerned that the urban input is being ignored. They feel that values held by the urban segment of the population should not be minimized by any decision blatently maximizing benefit to the livestock industry.

Recreation groups have a very positive attitude toward wildlife, the livestock industry and the Bureau's management policy. These resources require the maintenance of the open space so crucial for recreation activities. Range improvements may tend to impede access in some respects, but the general feeling is one of appreciation of the tradition of ranching as well as an awareness of wildlife. The social value of retaining the current style of management of public lands is recognized by these groups. Any great or marked change would be interpreted as curtailing their present use of the public lands.

The wild horse and burro protection groups, in combined membership, is the largest interest group. Although this represents world-wide participation, the majority of members reside in the Western United States. These groups want to ensure that wild horses and burros are protected and preserved in their present ecological setting. They maintain that these animals have an aesthetic, emotional and symbolic value for all those who view or learn about them. The horse, especially, played an integral part in the development of the United States, and is one of the few living embodiments of the quality of freedom and independence. This, they contend, is important in a world bound by rules, laws, constraints on behavior and general red tape.

The precise methodology for the management of these animals differs greatly among the interest groups themselves. Two groups feel that herd management and manipulation are necessary; another feels that the wild horse and burro populations should be left alone to develop within their own ecological niche. A fourth group is in favor of maximization of the horse population through water resources development.

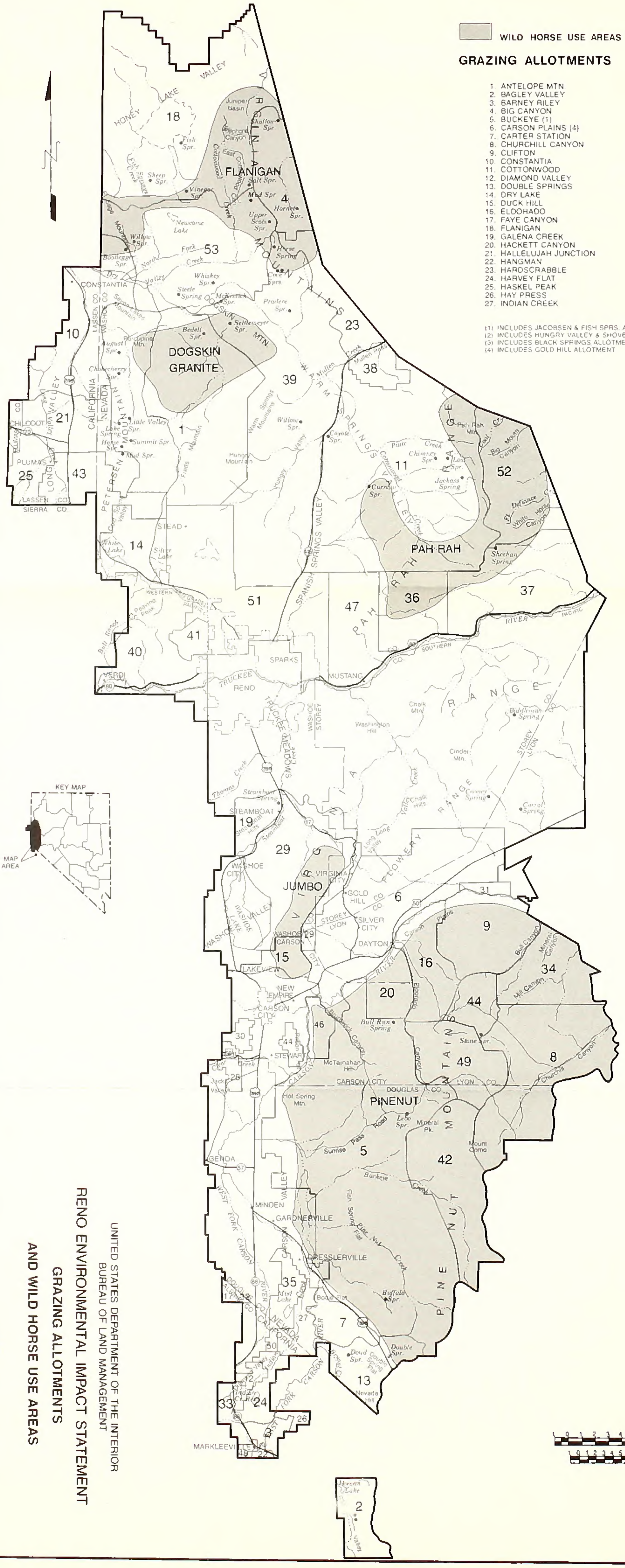
Regardless of the management technique advocated, all protectionist groups are concerned with the allegedly *low priority* which the BLM gives the horse and burro program. They resent being placed after the livestock industry and wildlife resources in order of consideration.

The Adopt-a-Horse program has met general approval from these groups. As long as it is closely monitored they feel it helps solve the excess numbers dilemma. One reported fault of the program is the length of time necessary for completion of the adoption process.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RENO ENVIRONMENTAL IMPACT STATEMENT
GRAZING ALLOTMENTS
AND WILD HORSE USE AREAS

1982

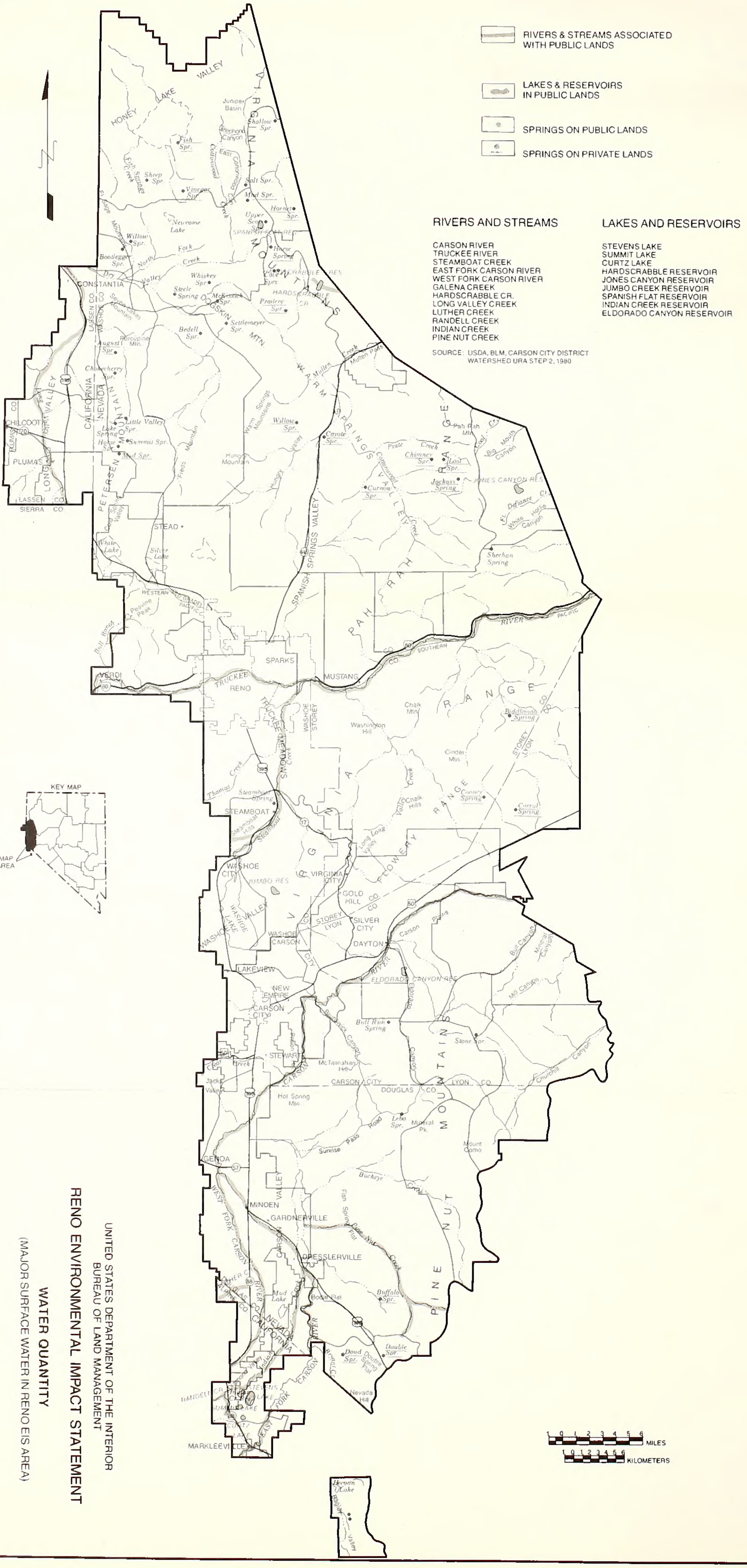


▨ WILD HORSE USE AREAS

GRAZING ALLOTMENTS

1. ANTELOPE MTN.
2. BAGLEY VALLEY
3. BARNEY RILEY
4. BIG CANYON
5. BUCKEYE (1)
6. CARSON PLAINS (4)
7. CARTER STATION
8. CHURCHILL CANYON
9. CLIFTON
10. CONSTANTIA
11. COTTONWOOD
12. DIAMOND VALLEY
13. DOUBLE SPRINGS
14. DRY LAKE
15. DUCK HILL
16. ELDORADO
17. FAYE CANYON
18. FLANIGAN
19. GALENA CREEK
20. HACKETT CANYON
21. HALLELUJAH JUNCTION
22. HANGMAN
23. HARDSCRABBLE
24. HARVEY FLAT
25. HASKEL PEAK
26. HAY PRESS
27. INDIAN CREEK
28. INDIAN HILLS
29. JUMBO
30. KINGS CANYON
31. KOCK DITCH
32. LUTHER CREEK
33. MILLBERRY CANYON
34. MILL CANYON
35. MUD LAKE
36. MUSTANG
37. OLINGHOUSE
38. PAH RAH
39. PAIUTE CANYON (2)
40. PEAVINE MTN. (3)
41. PEAVINE WATERSHED
42. PINE NUT
43. PLUMAS STATION
44. PRISON HILL
45. RAWE PEAK
46. SAND CANYON
47. SPANISH SPRINGS
48. SPRATT CREEK
49. SUNRISE
50. WADE VALLEY
51. WEDEKIND
52. WHITE HILLS
53. WINNEMUCCA RANCH

(1) INCLUDES JACOBSEN & FISH SPRS. ALLOTMENTS
(2) INCLUDES HUNGRY VALLEY & SHOVEL SPRS. ALLOTMENTS
(3) INCLUDES BLACK SPRINGS ALLOTMENT
(4) INCLUDES GOLD HILL ALLOTMENT



▭ RIVERS & STREAMS ASSOCIATED WITH PUBLIC LANDS

▭ LAKES & RESERVOIRS IN PUBLIC LANDS

▫ SPRINGS ON PUBLIC LANDS

▪ SPRINGS ON PRIVATE LANDS

RIVERS AND STREAMS

CARSON RIVER
TRUCKEE RIVER
STEAMBOAT CREEK
EAST FORK CARSON RIVER
WEST FORK CARSON RIVER
GALENA CREEK
HARDSCRABBLE CR.
LONG VALLEY CREEK
LUTHER CREEK
RANDELL CREEK
INDIAN CREEK
PINE NUT CREEK

SOURCE: USDA, BLM, CARSON CITY DISTRICT WATERSHED URA STEP 2, 1980

LAKES AND RESERVOIRS

STEVENS LAKE
SUMMIT LAKE
CURTZ LAKE
HARDSCRABBLE RESERVOIR
JONES CANYON RESERVOIR
JUMBO CREEK RESERVOIR
SPANISH FLAT RESERVOIR
INDIAN CREEK RESERVOIR
ELDORADO CANYON RESERVOIR

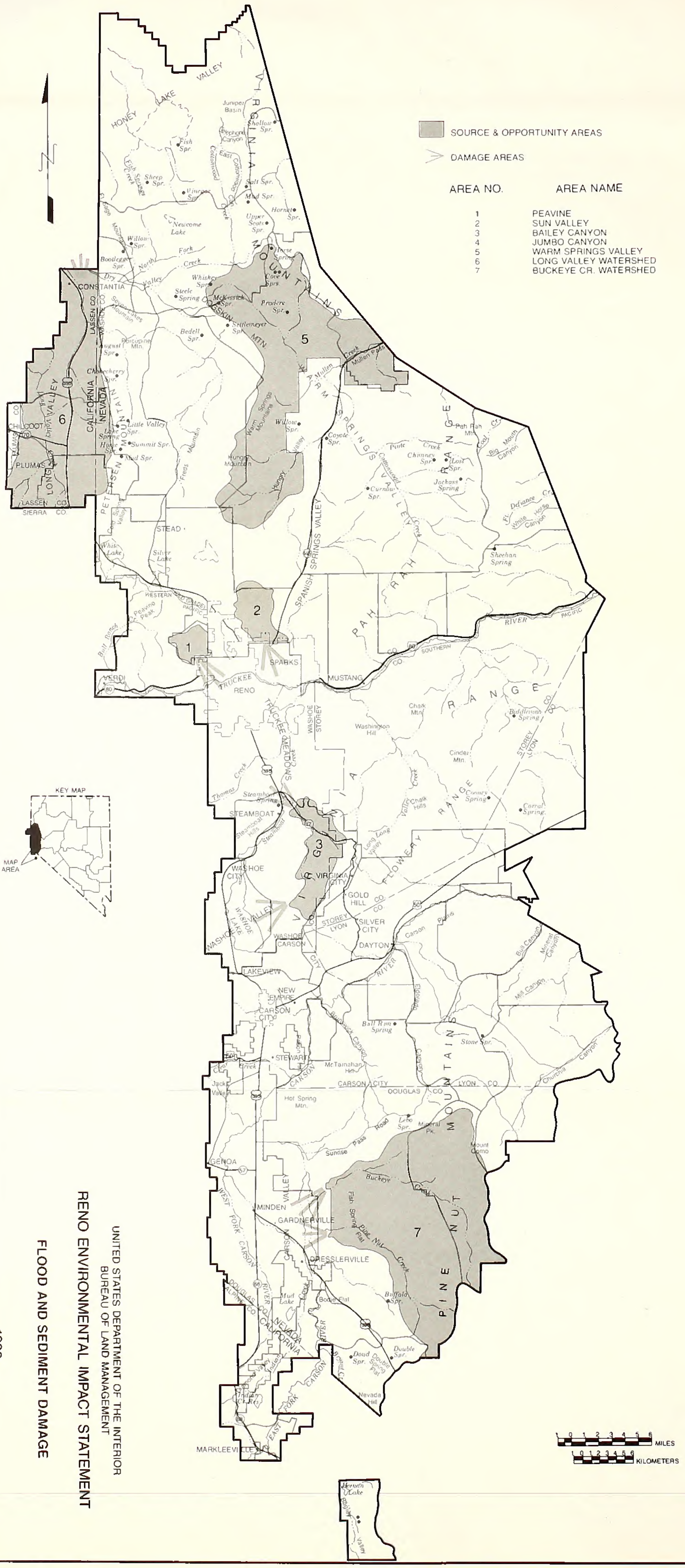
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RENO ENVIRONMENTAL IMPACT STATEMENT

WATER QUANTITY

(MAJOR SURFACE WATER IN RENO EIS AREA)

1982

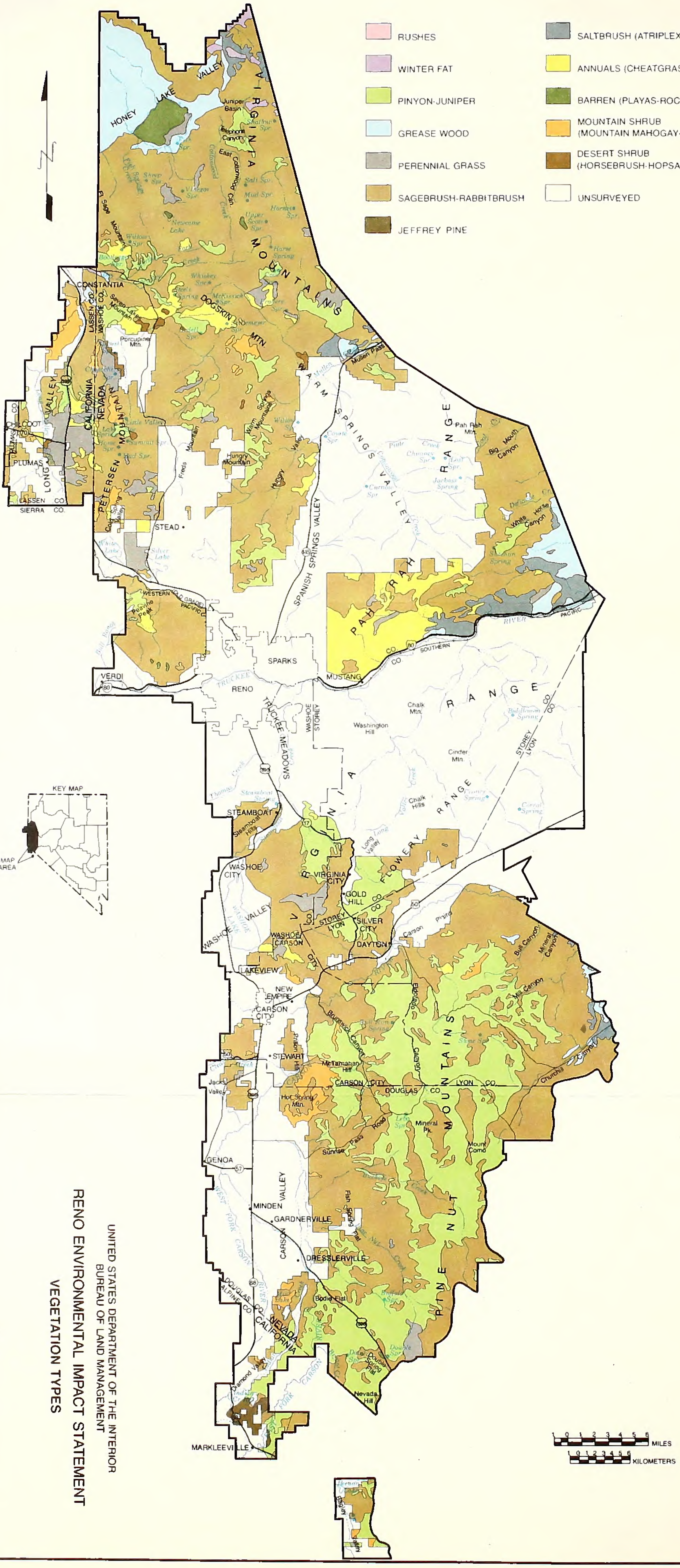


UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RENO ENVIRONMENTAL IMPACT STATEMENT

FLOOD AND SEDIMENT DAMAGE

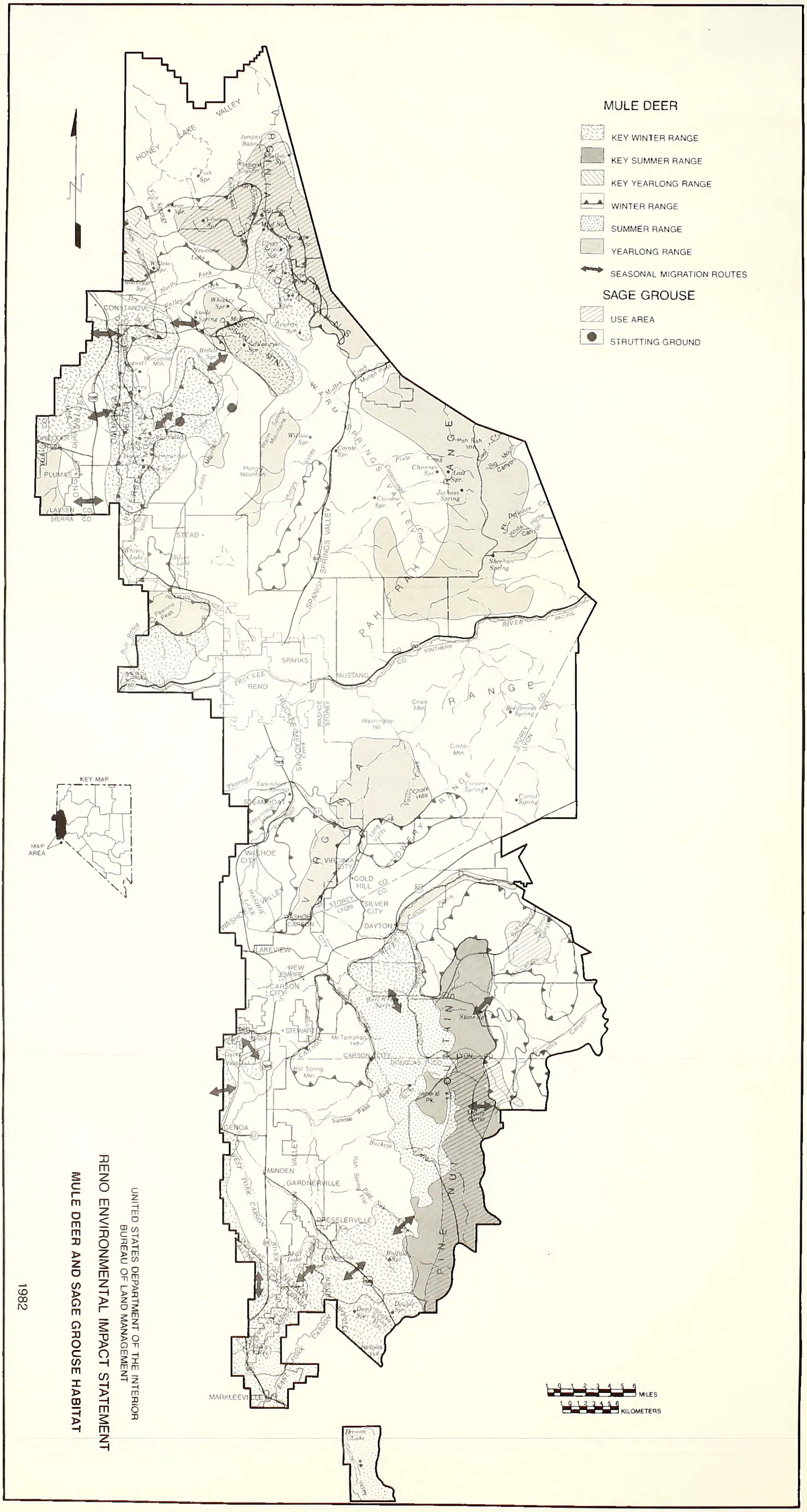
1982



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RENO ENVIRONMENTAL IMPACT STATEMENT
VEGETATION TYPES

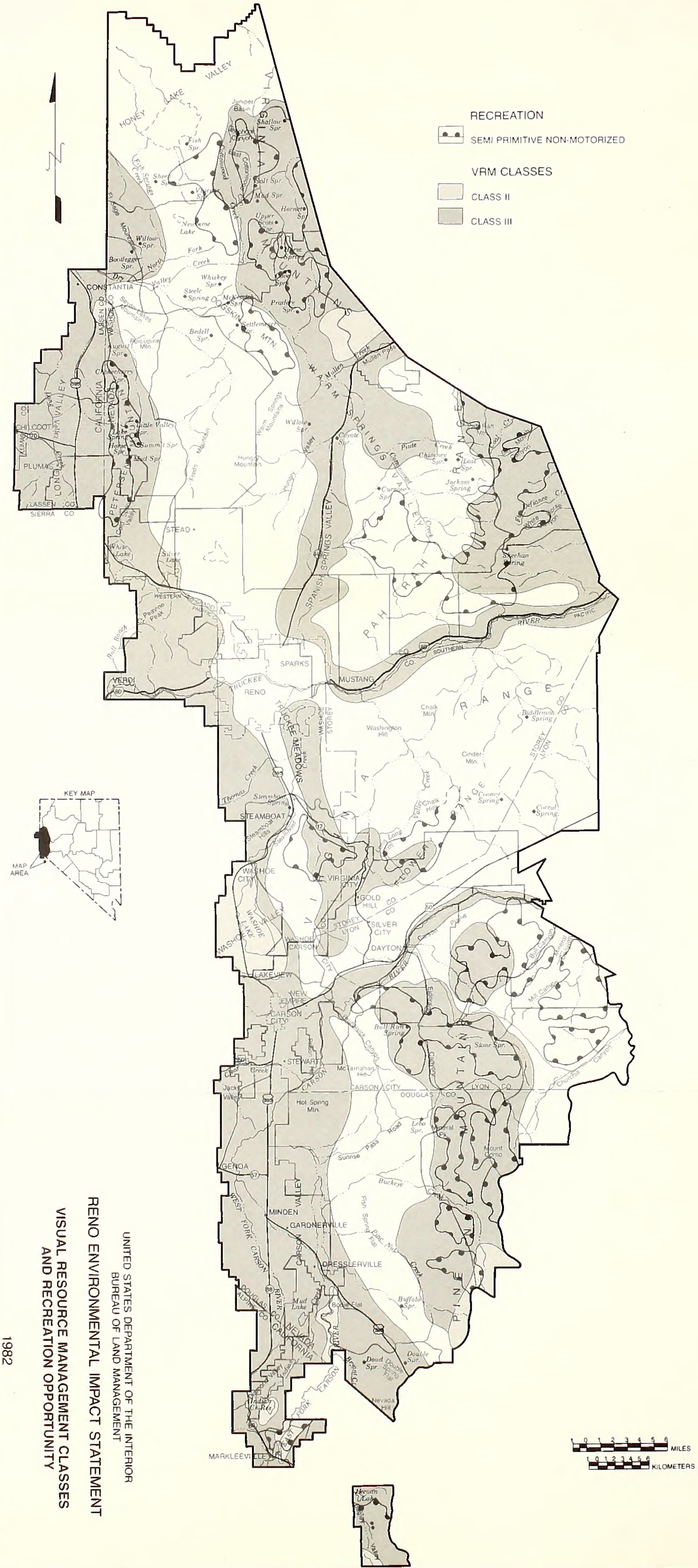
1982



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RENO ENVIRONMENTAL IMPACT STATEMENT
MULE DEER AND SAGE GROUSE HABITAT

1982



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RENO ENVIRONMENTAL IMPACT STATEMENT

VISUAL RESOURCE MANAGEMENT CLASSES AND RECREATION OPPORTUNITY

1982

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Chapter 3 presents analyses of the environmental consequences which would result from implementation of the alternatives, including the proposed action. As directed in Section 1502.16 of the National Environmental Policy Act (NEPA) regulations for Environmental Impact Statements (EIS), this chapter presents the scientific and analytic basis for the comparison of alternatives included in Chapter 1.

In keeping with the directives of Section 1502.2(b) of the NEPA regulations, the discussions of environmental consequences focus on impacts which are considered significant. Where the subheadings Relationship Between Short Term Use of Man's Environment and the Maintenance and Enhancement of Long Term Productivity and Irreversible or Irretrievable Commitment of Resources do not appear, impacts are considered insignificant and therefore no discussion was necessary. Unless otherwise noted all adverse impacts were considered to be unavoidable. Mitigating measures for a given action will be discussed as part of a site specific environmental assessment and will not be analyzed in this EIS. Where applicable, criteria (thresholds) used to establish significance are stated in the appropriate methodologies in the Appendix.

Impacts to water quantity and climate were analyzed and found to be insignificant. Therefore, no documentation of these components will appear in Chapter 3 of the EIS. Impacts to Cultural Resources, Visual Resource Management, Threatened or Endangered species, Areas of Critical Environmental Concern, air quality, and wilderness concerns are considered to be site specific and through standard operating procedures (Chapter 1) will be analyzed as part of an environmental assessment prior to implementation of any action.

ASSUMPTIONS AND ANALYSIS GUIDELINES

Certain assumptions about various environmental elements have been made in the analysis of the environmental consequences of implementing the alternatives. The following general assumptions apply to all analyses herein; specific assumptions for individual resources are included in the respective sections.

1) As part of Coordinated Resource Management and Planning (CRMP), Allotment Management Plans (AMPs) would be prepared where applicable. The plans would be monitored and evaluated following implementation so that periodic adjustments, if necessary, could be made on those plans not meeting multiple use objectives. Adjustments in grazing would be based on utilization studies, actual use data, trend, condition, etc.

2) For purposes of analysis, baseline data is based on ecological condition, trend, range site production and existing utilization studies as well as wild horse population information.

3) Should water be determined to be either unavailable or unsuitable at a proposed well location, an alternative location or an alternative source will be selected.

4) Under a given alternative when it is assumed that adjustments in wild horse and livestock use would occur, this action would take place over a five year period.

5) All impacts identified in this chapter are assumed to be direct significant impacts unless otherwise noted in the narrative as indirect or cumulative impacts.

6) Allotment Management Plans, including land treatments and range improvement projects, would not be developed in Intensive Wilderness Inventory Units under appeal or Wilderness Study Areas until a final decision on wilderness status has been made.

7) The BLM will have the funding and work force to implement and supervise a given alternative.

8) A range of possible impacts is identified and used where information essential for analyzing specific impact is lacking.

9) The concepts of CRMP will be considered in all cases prior to adjustments in grazing use. Also, other management techniques and systems, including range improvements, monitoring and evaluation will be applied to tailor implementation of on-the-ground resource management on an allotment basis.

Activity Plan suitability will be verified and/or modified before development. Existing monitoring studies, those established during CRMP, and the 1980 SVIM Survey will be evaluated and considered in developing grazing systems as a basis for making future grazing use adjustments. The numbers and locations of range improvements as discussed in the EIS could be altered when specific activity plans are finalized and following completion of an environmental assessment.

PROPOSED ACTION

SOILS

Present and potential erosion in the EIS area has not been quantified, although evidence of accelerated erosion can be observed around riparian habitat areas where heavy use by livestock and wild horses is evident. According to Meehan and Platts (1978), as grazing intensity increases, water runoff increases, which in turn accelerates erosion. This increase is due to reduced *infiltration* rates caused by soils compaction and lack of vegetal cover. Under this alternative there will be a significant decrease in erosion, flooding and sedimentation. According to Holechek (1981), studies have found that controlled grazing resulted in watershed (i.e., soils) improvement rather than deterioration. This intensive management system would improve the existing resources and ecolgical condition through fencing of riparian areas, seedings, spring developments, controlled grazing, etc.

Areas that will benefit significantly from this proposal are riparian habitats and critical watershed areas where erosion potential is high (Soils URA, Step 2, 1980).

WATER QUALITY

Uses which could be affected by this alternative are: (1) treatable drinking water, (2) wildlife and livestock watering, and (3) agricultural use. The selected water quality parameters (thresholds) influencing these beneficial uses are turbidity (caused by sediments and soils eroding from streambanks, gullies and the watershed), water temperature (controlled mainly by shade-producing vegetation along rivers and streams) and fecal coliform levels (from livestock/wildlife wastes)(Appendix B, Section 1).

Three springs exceeding the quality criteria are in allotments that fall under Category I of this alternative. These and other waters of similar quality are expectd to improve in quality due to proposed intensive livestock management, range improvements and riparian habitat protection.

Proposed management actions for Category M and C allotments under this alternative will have little effect on water quality.

VEGETATION

ECOLOGICAL CONDITION, FORAGE CONDITION AND TREND

With the initiation of management and land treatments (Table 1-3), *ecological condition, forage condition* (in existing seedings) and trend will improve.

The rate of change in condition would depend on the production potential of the range sites involved, the current vegetation condition and cover, available seed sources, extent of range improvements and climatic conditions (Stoddart and Smith, 1955).

High potential range sites in fair condition have the best chance for significant improvement in condition and trend (Appendix E, Section 2). Low potential range sites (eg., shadscale, *Atriplex confertifolia*, and Bailey greasewood, *Sarcobatus baileyii*) in poor or fair condition have little chance for improvement. Holmgren and Hutchings (1972) found very little response in the salt desert shrub type after 32 years of protection from grazing.

Based upon review of literature cited in this section and knowledge of the resource area range site potentials, BLM and Soil Conservation Service (SCS) range specialists developed a methodology for predicting future changes in vegetation condition (Appendix E, Sections 1 and 2 and Appendix F, Table 1-1). Within 10 years of implementation, the overall resultant shift in ecological condition on native range will be as follows: (1) excellent condition will increase by 3,017 acres; (2) good condition will increase by 28,448 acres; (3) fair condition will decrease by 12,687 acres; and (4) poor condition will decrease by 18,778 acres. A total of 47 percent of the EIS area will remain in poor ecological condition. Similar changes in forage condition on exisitng seeded range will occur with the following results: (1) excellent condition and good condition will increase by 15 and 374 acres, respectively; (2) fair forage condition will decrease by 289 acres; and (3) poor forage condition will decrease by 100 acres (Appendix F, Table 1-2).

Upward trend will increase from 43,649 acres to 458,964 acres as a result of management actions proposed in Category I allotments (Chapter 1, Proposed Action).

These improvements will result from favorable changes in plant species composition, production, cover, density, vigor and vitality. The rate and degree of improvement indicated above is based upon the assumption that in addition to management and treatments proposed in this alternative, utilization study methods will be modified as described in Appendix E, Section 1.

This alternative assumes the implementation of AMPs and/or revision of AMPs in 10 allotments in Category I (Table 1-1). It is assumed that all grazing systems in these AMPs will be tailored to fit the vegetation range site potentials, climate, growing season and the management objectives of the allotments in which they are implemented.

In the Category I allotments, ecological condition, forage condition and trend will benefit from the implementation of grazing systems. The probable increase in production, vigor and vitality of desirable climax plant species will result in secondary succession towards good and excellent ecological condition on native range. Similar increases for seeded species in existing pastures will result in improved forage condition and prolonged productive life (Shiflet and Heady, 1971 and Leithead, 1960).

The above will apply to Category I allotments only. Monitoring plans will be developed for Category M, I and C allotments and monitoring in addition to current management, will continue in these allotments in the near future. At some time in the future, based upon monitoring results, more intensive management actions may be implemented in some allotments to maintain or improve vegetation condition and trend. This possibility, plus the assumption of an improved approach in utilization studies (Appendix E, Section 1) was the basis for predicting improvement in ecological and forage condition in these allotments (Appendix E, Section 2 and Appendix F, Table 1-1).

Possible adjustments in periods-of-use, independent of implementation of other grazing systems will help meet the physiological requirement of key management species. Increases in vigor, vitality and percent composition of desirable species in plant communities will result. For the purpose of analysis, it is assumed that these adjustments will be made on more than half of the Category I allotments to prevent further deterioration of the vegetation resource. This will help to improve the ecological condition and trend on native range, and forage condition and trend in seedings (Hanley, 1979; Blaisdell and Pechanec, 1949; Britton et al, 1979; Martin, 1978; Herbel, 1971; Mueggler, 1950; Laycock, 1961 and Cook, 1971).

With the implementation of this alternative existing stocking rates for livestock may be adjusted in Category I allotments to meet allotment objectives (Chapter 1, Proposed Action). Future adjustments will be determined in part by analysis of actual use records, monitoring and utilization studies and evaluated through the CRMP process. Wild horse numbers will be reduced in some areas so that they do not exceed the carrying capacity of the area. Mule deer habitat in Category I allotments, will be managed in order to achieve reasonable numbers as determined by the Nevada Department of Wildlife (NDOW) and BLM (Table 1-2).

The relationship between grazing intensity *(stocking rate)*, ecological condition, forage condition and vegetation trend would indicate that reduced grazing pressure on vegetation resources will allow an increase in desirable plant species' vigor, vitality, cover and production, resulting in improved condition and trend (Houston and Woodward, 1966; Van Poollen and Lacey, 1979; Clements, 1949, and Cook and Stoddart, 1963). Use of current study results and methods of measuring grazing intensity for the purpose of adjusting stocking rates to proper levels, however, will result in less than optimum management for improving vegetation condition and trend. The net result expected will be a slow improvement in ecological condition, forage condition and trend until revised monitoring and study procedures can be implemented, resulting in further improvements in the vegetation resources (Appendix E, Section 1). Of the improvements proposed for Category I allotments, the most significant is the 6,655 acres of sagebrush control, followed by drill seeding of a mixture of grasses, forbs and shrubs (Table 1-3). These areas of sagebrush control will involve eight range sites which have moderate potential, either poor or fair ecological condition, with big sagebrush aspect. These treatments would cause a conversion from existing predominately sagebrush types to artificially maintained vegetation communities of introduced grassland species. Some direct impacts will include additional livestock and wild horse utilization that may occur on native range while the protected seedings are becoming established. This initial increase in grazing demand on native range will slow improvement in ecological conditon and trend. Once the seedings are established, however, a significant increase in AUMs will be available for grazing use. Within five years, an additional 425 AUMs could be available, and within 10 years an additional 1,700 AUMs. These increases are based upon site potential from the 1978-1980 SVIM survey and do not consider the loss in AUMs due to trampling and waste by livestock (Eckert, 1980). This increase in available AUMs will, in the long term, decrease the grazing intensity on native range and allow desirable plant species to increase in vigor, production and abundance ultimately resulting in improved ecological condition and trend.

Mechanical means of sagebrush control (eg., disc plowing or root plowing) would be most feasible, as few environmental hazards are associated with mechanical brush eradication and the success of the treatment should be high due to the ease with which the treatment can be controlled.

Direct impacts of other range improvements (eg., pipelines and fence construction) would be minimal due to the small number of units involved (Table 1-3). These improvements support grazing systems, however, and therefore contribute to the improvement in vegetation condition and trend predicted for the Category I allotments.

In summary, AMPs, tailored grazing systems which will be part of the AMPs, range improvements which support these grazing systems (eg., water developments and fencing), adjustments in livestock numbers and 6,655 acres of sagebrush control and seeding proposed in Category I allotments along with the less intensive management actions (eg., adjustments in periods-of-use) which may occur in all allotments as a result of the CRMP process and monitoring studies, will all serve to improve the vegetation resource. The increase in the production, cover, vigor and vitality of desirable climax plant species will result in secondary succession towards good and excellent ecological condition on native range, good forage condition on existing pastures and improved trend. With the revision of the monitoring and study procedures (Appendix E, Section 1), the rate and degree of these improvements will increase. The overall net result will then be a five percent increase in the good and excellent ecological condition classes, a four percent increase in the good forage condition class, and improved trend over 415,315 acres (Appendix E, Section 2 and Appendix F, Table 1-2).

RIPARIAN AND ASPEN COMMUNITIES

For the purpose of analysis, under this alternative adjustments in livestock and wild horse grazing intensities will occur. Allotment Management Plans for Category I allotments, with grazing systems which include periods-of-use, will provide for improvement in riparian vegetation. Wildlife habitat protection improvements and rangeland improvements will be implemented (Table 1-3).

Even with reduced numbers of livestock however, continued overuse of unprotected riparian habitat will occur. Livestock and wild horses will continue to overutilize the more palatable vegetation available in riparian areas before making any significant use of the vegetation in the uplands. Thus, the ecological condition of unprotected riparian habitat is not expected to improve, and impacts from livestock and wild horse grazing on riparain habitat are expected to continue in all allotments (Dahlem, 1979 and Benke and Raleigh, 1978).

Grazing systems will result in improved ecological condition on upland range. The net result of rest provided by grazing systems during critical growth periods of key management species would be a deceleration of riparian deterioration (Platts, 1979; Storch, 1979; and Behnke and Raleigh, 1978).

Behnke and Raleigh (1978) state, "There presently are no such guidelines or range management techniques in use, short of fencing, that can protect riparian vegetation from overgrazing by domestic livestock". The spring sites proposed for development and fencing in Category I allotments will receive complete protection from livestock grazing. Other riparian areas such as stringer meadows and stream banks which currenty show site deterioration partly due to overutilization by livestock or wild horses, are proposed for protection through fencing (Table 1-3). With the implementation of this alternative 183 acres of currently abused riparian habitat will be protected from overgrazing and will improve significantly in ecological condition within 10 years (Appendix E, Section 2 and Appendix F, Table 1-1). Plant species diversity, cover, and production will improve resulting in increased streambank stability, sediment control, and improved habitat for all wildlife (Dahlem, 1979 and Duff, 1979).

Aspen habitat is critical in the EIS area because of its limited occurrence, and the fact that it furnishes valuable shelter, cover, and food to livestock, wild horses and a variety of wildlife. This alternative will benefit the aspen communities within the EIS area as improvements would result from adjustments in grazing intensity and the establishment of grazing systems.

Proposed seedings and adjustments in grazing intensity are expected to improve ecological condition over time. Plant species composition, production and cover will improve in all areas, thereby reducing grazing pressure on aspen reproduction resulting in increased production (Dahlem, 1979). Coles (1965) reported that sufficient forage for the number of grazing animals would prevent serious damage to aspen reproduction. Heavy use by livestock results in damage to aspen reproduction only where forage is insufficient to support the number of livestock. Thus, intensive management to include adjustments in grazing intensity, grazing systems, adjustments in periods-of-use and range improvements will result in improved aspen root sucker survival and the perpetuation of existing aspen stands. The rate of improvement in the ecological condition of aspen sites will be expected to parallel the rate of improvement in ecological condition of all other range sites (Appendix E, Section 2 and Appendix F, Table 1-1).

In summary, the overall result of proposed management and rangeland improvements, including the revision of monitoring and study procedures (Appendix E, Section 1) on the ecological condition of riparian habitat will be as follows: an eight percent decrease in poor condition, a three percent decrease in fair condition, a 10 percent increase in good condition and a one percent increase in excellent condition. Aspen habitat will improve in ecological condition in a similar fashion with results as follows: a six percent decrease in poor condition, a two percent increase in fair condition, a three percent increase in good condition and a one percent increase in excellent condition (Appendix E, Section 2 and Appendix F, Table 1-1).

WILDLIFE

Under this alternative Category M and C allotments would remain as under the No Action alternative, and would be monitored at a lower intensity. In Category I allotments, the existing situation would be monitored and adjustments in livestock grazing would be made based in part on utilization studies and carried through the CRMP process.

MULE DEER

Existing use by mule deer in Category I allotments is 5502 AUMs; reasonable numbers demand is approximately 9650 AUMs. Under this alternative, there will be no short term increase in mule deer numbers as a result of increased forage from lessened livestock grazing. Long term increases in numbers would only be possible if forage is adequate to meet reasonable numbers demand. Based on preliminary data from existing studies, the existing demand by livestock, wild horses and mule deer exceeds the supply of forage currently available by approximately 8000 AUMs per year. All Category M and C allotments would remain as they are, and any increase in mule deer numbers would be a result of improved conditions resulting from good weather and climate patterns.

Mule deer numbers could increase over the long term in Category I allotments, if grazing treatments five and six (Chapter 1) were implemented in allotments where bitterbrush is recognized as a key species. Allotments where this action would improve vegetation to the point additional forage would be available for mule deer include: Antelope Mountain, Constantia, Winnemucca Ranch, Paiute Canyon, Buckeye, Pine Nut and Sunrise. The increase in forage would be dependent upon the rate at which AMPs and grazing systems are implemented. Category I allotments listed above cover identified crucial deer winter, summer and yearlong ranges (Mule Deer and Sage grouse Habitat Map).

Aspen reproduction, the vegetative understory in aspen and cottonwood stands, and forbs around springs and seeps and along streams would be significantly improved if habitat protection improvements included in Table 1-3 were implemented on the following Category I allotments: Antelope Mountain, Constantia (including portions of Long Valley Creek), Winnemucca Ranch (including Stateline Peak and Lower Wildcat springs), Paiute Canyon, Buckeye (includes repairing Bull Run Spring), Pine Nut and Sunrise (including springs at Sunrise Camp). The improved aspen reproduction will maintain and increase structural diversity for nongame wildlife, particularly perching birds and raptors. Protecting the understory in aspen and cottonwood groves and around waters will allow for a vastly increased quantity of forbs, which will benefit lactating does and their fawns, sage grouse chicks and nongame wildife through increased forage.

Habitat protection improvements in Table 1-3 are characterized by protective fencing which would eventually provide an improvement in mule deer habitat. Where waters are fenced, standard BLM procedures include a spring/collection box, ground-level trough inside the fence for wildlife species, and a trough outside the fence for livestock and wild horses which would lessen impacts to vegetation and riparian habitat by providing better distribution. Most of the proposed fenced areas would be less than 200 feet on a side. Where streams such as Long Valley Creek are considered adequate, water gaps would be left for livestock and wild horses, resulting in better distribution and favorable impacts to the vegetation resource and riparian habitat.

SAGE GROUSE

Under this alternative implementation of habitat protection projects (Table 1-3) would maintain or improve small, but key habitats (meadows, tree clumps, and waters). According to professional judgment this would result in more forbs and insects associated with them which would provide more forage for sage grouse resulting in a population increase of at least 50 percent. Category I allotments involved would include: Antelope Mountain, Pine Nut, Buckeye, Winnemucca Ranch, Big Canyon and Flanigan (Mule Deer and Sage Grouse Habitat Map). Comments made concerning the types of habitat improvements under the Mule Deer section would also apply to sage grouse.

CHUKAR

Continuation of existing management under the short term would maintain vegetative condition or enhance key chukar habitat with the result that chukar populations would increase slightly. Chukar populations are subject to the vagaries of weather, e.g., a cold, wet spring will have more negative effect on these birds than range conditions. However, populations of chukar do respond favorably to adverse range conditions.

NONGAME BIRDS

This alternative could allow the continued decline of the small, but key habitats which are so important to most nongame bird populations unless these habitats are protected from further deterioration (Table 1-3) which would result in a subsequent increase in nongame bird numbers. Fencing aspen and cottonwood groves and streamside vegetation, plus vegetation around springs and seeps would maintain the vegetative structural diversity which attracts nongame birds. Also, with the increase in understory, additional forbs and seeds would be available.

WILD HORSES

Under all alternatives removal of wild horses from private lands is required by law if requested by the private landowner. The Pah Rah and Jumbo Herd Use Areas (HUAs) contain private lands intermixed with public lands. Since there have been requests from the private landowners in these two areas to remove wild horses, it is probable that this will be done resulting in the loss of the wild horse population, since there is not enough public land in either area to support a wild horse herd without the horses straying onto private lands (Table 1-4). However, removing the wild horses will lessen the impacts to the vegetation resource.

The Pine Nut Herd Unit has private land in the southern portion and requests have been received asking for removal of the existing wild horses (Table 1-4). Enough horses will have to be removed both from private and surrounding public lands to insure that the wild horses will not continue to stray onto the private lands.

These actions will cause an adverse impact to the wild horse populations (Wild Horses, Maximization of Livestock Alternative).

Wild horse numbers in other HUAs, including the remainder of the Pine Nut area, will be determined through land use planning with the input of CRMP.

RECREATION

Under this alternative, receational hunting, fishing and wildlife viewing would be enhanced slightly by increased mule deer numbers and improved riparian habitat conditions over the long term. The demand, however, for mule deer hunting tags would still far exceed supply.

The proposal to remove all wild horses from the Jumbo and Pah Rah HUAs would have an impact on public viewing opportunities in those areas.

Proposed improvements in Category I allotments (Table 1-3) have potential to impact recreation use as fencing riparian habitat could be a barrier to the recreationist's movement on horseback or foot.

Proposed improvements such as seedings, pipelines and roads or vehicle trails could have an impact in the few areas identified in Chapter 2 as providing semi-primitive non-motorized recreation opportunity. These improvements would cause a further loss of undeveloped non-motorized recreation opportunities such as hiking, hunting, nature study and horseback riding.

LIVESTOCK GRAZING

For Category I allotments, grazing systems, range improvements and other resource needs will be determined through the land use planning system with the help of CRMP. Carrying capacities and adjustments in livestock use will be based in part on monitoring studies and will be beneficial to the range resource (Martin S. Clark; Thomas & Heady, etc. 1971).

Availability of vegetation as a result of intensive management (Summary Table 1-1) will result in more and better quality forage, better soils cover and plant vigor. Higher quality and improved forage production will increase calf and lamb weaning weights in the future and increase calf and lamb crops to allow an increase in stocking rates (Ensminger; Maynard and Loosli). Category M and C allotment impacts would be similar to the No Action alternative.

Implementation of grazing systems and periods-of-use would necessitate moving livestock several times throughout the year, which would increase the workload of some permittees causing an increase in the cost of a given operation (Economic Impacts, this alternative).

Implementation of an intensive monitoring system will be a significant positive impact as future ecological changes and range condition can be closely monitored, and any changes necessary can be made before significant resource damage occurs.

ECONOMIC IMPACTS

The analysis in this section is based on the assumptions as stated in Appendix L, Section 2 and is primarily based on linear programming (LP) analysis which generally conforms to procedures outlined by Gee (1981). It should be noted that the impacts analyzed here are only rough approximations of what may occur if this alternative is implemented and should not be considered predictions of future activity.

It is assumed for analytical purposes that at the conclusion of the CRMP process those ranchers with allotments in Category I would adjust their public land grazing in the EIS area. It is also assumed that ranchers with allotments in Categories M and C would continue grazing at current levels in the near future.

In the short run (after implementation of CRMP recommendations, but before expected improvements in herbage production) the Proposed Action could result in lower herd size and less income for those ranchers with allotments in Category I.

Since four of the five cattle ranches in the yearlong category have allotments proposed for the I classification, the typical ranch in this category would have the most significant impacts. The linear programming (LP) model for the yearlong category indicates that the ranchers would respond to decreases in public land grazing by reducing herd size about 30 percent. This could result in a loss of about $16,000 per year from the current income level of $34,000, a 50 percent decrease (Table 3-1).

Since three of the five sheep ranches would have allotments in Category I, the typical sheep ranch could also be significantly affected by this alternative. The LP model results indicate that the typical sheep ranch would respond to decreases in public land grazing by reducing herd size about ten percent. This could result in a loss of about $12,000 from the current income level of $57,000, a 20 percent decrease. The high dependency cattle ranches could be expected to lose about $3,000. No significant impacts would occur to the low dependency cattle ranches (Table 3-1).

Total short run loss of earnings from these ranches could be about $275,000, a decrease of about 15 percent. In addition, 15 full-time equivalent jobs could be lost.

The total decrease in regional earnings, including the multiplier effect, could total as much as $650,000. Employment could drop by 45 jobs.

In the long run there could be an increase in income above the short term, but it could still be below the current level. The LP models estimate that the typical yearlong cattle ranch could make $10,000 less than current income, but $6,000 more than in the short term. The sheep model projects a decrease of $12,000 from the current income level, or no change from the short term. The high dependency cattle ranch model projects a decrease of $3,000 from current income, or no change from the short term. No substantial change in the low dependency cattle ranch model was projected.

Overall, ranch sector earnings could be about $250,000 below the current level, but $25,000 above the short term and $150,000 above the No Action alternative. No significant change in ranch employment would occur.

The total long run decrease in regional earnings including the multiplier effect could be about $24,000. Employment could decrease by 35 jobs. This alternative could also effect the capital value of the grazing allotments. Much of this affect would depend on the expectations of those involved in the ranch real estate market. If they do not expect any improvement from the short run level, capital value losses could total $1.2 million, a decrease of about 35 percent. In the long run the capital value of the allotments could increase by $200,000 above the short term, but still remain $1 million under the current level.

The increase in deer populations projected for Category I allotments could result in an increase in deer hunting expenditures. This in turn could result in an increase in regional income of about $12,000 including the multiplier effect (Appendix L, Section 5). Changes in income from other wildlife related expenditures (from hunting other species, sightseeing, photography, etc.) as well as non-monetary values (i.e., existence values) could also occur. These are not quantifiable due to lack of data.

SOCIAL ANALYSIS

RANCHING COMMUNITY

This alternative was somewhat more favorably received by ranchers interviewed than the No

TABLE 3-1
RANCH ECONOMIC IMPACTS
PROPOSED ACTION

	CATTLE			SHEEP
	YEARLONG	SUMMER USE HIGH DEPENDENCY	SUMMER USE LOW DEPENDENCY	
SHORT TERM				
Herd Size (cows/ewes)	490	230	470	3,500
Public Land AUMs	2,350	600	210	1,380
Gross Revenue	$105,000	$54,00	$129,000	$200,000
Total Costs	87,000	37,000	91,000	155,000
Net Ranch Proprietors Income	18,000	17,000	38,000	45,000
Change from Present	-16,000	-3,000	-	-12,000
Net Labor and Proprietors Earnings	29,000	21,000	49,000	83,000
Change from Present	-26,000	-4,000	-	-18,000
LONG TERM				
Herd Size (cows/ewes)	550	230	470	3,500
Public Land AUMs	2,820	600	180	1,380
Gross Revenue	119,000	$53,000	$129,000	$201,000
Total Costs	95,000	36,000	91,000	156,000
Net Ranch Proprietors Income	24,000	16,000	38,000	45,000
Change from Present	-10,000	-3,000	-500	-12,000
Net Labor and Proprietors Earnings	38,000	21,000	49,000	84,000
Change from Present	-17,000	-5,000	-600	-18,000

Totals may not add due to rounding.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, 1981.

Action alternative. Some doubt was expressed about the possibility of future adjustments in livestock from current use levels. However, the concept of the CRMP involvement was viewed as a vehicle for the continuation and improvement of their lifestyle. All ranchers interviewed felt this was a positive approach to the management process and actions under each category of allotment could be beneficial to their operations.

Every rancher interviewed stated that the wild horse numbers should be greatly reduced. This would require adjustments in Category I allotments. The ranchers predicted an increasing competition between livestock and wild horses. This alternative could reduce stress caused by this competition.

The time spent in monitoring could result in management decisions beneficial to the rancher. The only drawback expressed by several ranchers interviewed was that trend studies and monitoring might indicate that livestock reductions were necessary.

STATE AND NATIONAL IMPACTS

Recreationists, wildlife defenders and professionals and wild horse interest groups objected to this alternative because they advocate rehabilitation and protection of the rangeland. In personal interviews they expressed feelings that this alternative would result in a *continued deterioration of the rangeland*. They feel that a heavy emphasis on the livestock industry would negatively impact the existence and appreciation of wildlife and wild horses and reduce recreation opportunities.

NO ACTION ALTERNATIVE

SOILS

The impacts of this alternative would be the continuation of accelerated erosion and soil loss. Heavy use in riparian habitat areas, springs and streams would continue to degrade the quality of these areas.

WATER QUALITY

Under this alternative two streams documented as exceeding turbidity and temperature limits for fisheries habitat, two springs which exceeded turbidity limits for treatable drinking water, and all public surface waters which passed fecal coliform limits for agricultural use, treatable drinking water, wildlife and livestock watering would maintain the current trend.

Continued livestock and wild horse grazing along the streams and around springs in the EIS area is expected to cause those waters that exceeded the water quality standards to continue in a downward trend in quality. Those waters that passed the standards are also expected to degrade in quality.

These conclusions are based on the 1979 water quality survey of the Reno EIS area, State of Nevada Division of Environmental Protection Water Quality Data, and current observations conducted by BLM.

VEGETATION

ECOLOGICAL CONDITION, FORAGE CONDITION AND TREND

Continuation of the present range management program will perpetuate the current downward trend in 26 allotments of the EIS area, resulting in deterioration of the ecological and forage condition over the long term (Table 2-4). Currently, 14 allotments show static trend and seven show upward trend. In those allotments with static trend there will be no change in ecological condition. In those allotments with upward trend there will be an improvement in ecological condition. The shift in condition for each individual allotment is shown in Appendix E, Section 2 and Appendix F. In ten years, the overall resultant shift in ecological condition on native range will be as follows: (1) excellent condition will increase by only three acres, (2) good condition will decrease by 4048 acres or less than one percent, (3) fair condition will decrease by 13,854 acres or two percent, and (4) poor condition will increase by 17,899 acres or three percent. A total of 54 percent of the EIS area will remain in poor ecological condition. Similar changes in forage condition on seeded range will occur with the following results: (1) good condition will increase by 180 acres or two percent of the total acres, (2) fair condition will decrease by 162 acres or two percent, and (3) poor condition will decrease by 18 acres or less than one percent. Overall, there will be a three percent decrease in ecological condition and a two percent increase in forage condition (Appendix E, Section 2 and Appendix F).

The continued deterioration of ecological condition is the result of several factors, most notably the overutilization of the vegetation resource by livestock and wild horses. Overutilization is occurring in 15 allotments (Range Management, URA Step 3). Several allotments exhibiting overutilization are continually grazed year-round, during the wrong season, or have early livestock turnout (Table 1-1). Continued overutilization of vegetation from heavy stocking rates will result in continued deterioration of plant vigor and a decrease in desirable climax plant species, ultimately resulting in deteriorated range condition. Early livestock turnouts and improper periods-of-use will have similar effects on the vegetation resource. Depletion of carbohydrate reserves during the early growing season is believed to be a primary factor for loss of plant vigor and subsequent range deterioration (Trlica et al., 1971). Pearson (1964) shares this belief. Laycock (1961) has stated that range condition remained essentially unchanged where grazing was repeatedly continued in the same season resulting in continued downward trend. Recorded downward trend and the high percentage of poor range conditon further substantiates the above findings (Table 2-4).

The methodology for determining change in ecological condition for this alternative is based upon the above cited references and the opinions of District Range Conservationists. The concluding evidence indicates current trend as shown in Table 2-4 will continue under this alternative (Appendix E, Section 2 and Appendix F).

RIPARIAN AND ASPEN COMMUNITIES

Most of the riparian type will continue to be degraded by livestock and wild horse grazing (Table 2-3). Livestock and wild horses will continue to overutilize the more palatable vegetation in riparian areas before making any significant use of the vegetation in the uplands. Primarily for this reason, ecological condition of this habitat type is not expected to improve (Dahlem, 1979 and Behnke and Raleigh, 1978). Estimates indicate a four percent increase in poor ecological condition, while fair ecological condition will decrease a like percentage (Appendix E, Section 2 and Appendix F, Table 1-3). Davis (USDA, 1977) summarized the impacts from livestock grazing on riparian vegetation as follows:

> *Overgrazing by domestic livestock is probably the major factor contributing to the failure of riparian communities to propagate themselves. Continued overuse of riparian bottoms eliminates essentially all reproduction as soon as it becomes established. Overstocking and the consequent loss of vegetative cover on the adjacent watersheds is probably the main reason for the frequency of high intensity floods resulting in drastic changes in the density and composition of riparian bottoms.*

Lack of improvement or continued deterioration of the riparian habitat type is felt to be an impact.

The aspen habitat in the EIS area is in deteriorated condition with poor stand regeneration (Table 2-3). These stands are composed largely of mature trees. As these mature trees die and regeneration is suppressed by overgrazing and bedding of livestock and wild horses, the stands will eventually be markedly reduced in size or eliminated. Coles (1965) reported that, "As herbs and palatable browse are depleted by overgrazing, damage to aspen reproduction increases. With very heavy browsing, aspen reproduction does not survive beyond the age of about five years". The reduction or loss of aspen communities would be an impact due to: (1) the simplification of the environment through loss of plant species diversity, and (2) the loss of valuable food and cover for livestock and numerous species of wildlife. Paralleling the deterioration in ecological condition of most of the native range, the aspen habitat type is expected to increase two percent in poor condition (Appendix E, Section 2 and Appendix F, Table 1-3).

WILDLIFE

Under this alternative, existing habitat quality for all allotments would continue to deteriorate due to forage demand by livestock and wild horses. This would be most pronounced in small habitat types, aspen stands, riparian zones and meadows, but would occur on open rangelands as well. Vegetative production would decline over time as carrying capacities would remain below potential and competition for available vegetation would remain high.

MULE DEER

Significant competition with domestic livestock for available forage would continue on all currently grazed allotments, and on the allotments used by wild horses. Vegetation would continue to receive seasonal, concentrated use with no periodic rest.

Under this alternative, continued season-long grazing, particularly on key deer winter ranges, would continue to have a significant impact on bitterbrush seedling survival. The forbs which normally grow under aspen and cottonwood groves and in meadows would continue to be overutilized, resulting in less quality (nutritional) forage for lactating does. This applies also to forbs on key deer summer range in the Pinenut, Buckeye, Churchill Canyon and Sunrise allotments.

In the short term, mule deer populations would remain about the same while under favorable climatic conditions. Continuation of present grazing practices would have a significant impact on mule deer in the long term, particularly during periods of drought or heavy snowfall. As a result, long term carrying capacity for mule deer would gradually be reduced.

SAGE GROUSE

Livestock and wild horses would continue to make heavy use of meadows and riparian areas causing a significant decline in the condition of these areas. Vegetative production and quality on critical brooding areas would continue to be below potential. This deteriorated habitat condition would continue to impact sage grouse since they depend on the forbs in meadows and the insects associated with meadow vegetation. It is likely on the Sand Hills/Bedell Flat area north of Reno that the sage grouse populations would become extinct.

CHUKAR

Chukar are well adapted to poor range conditions created by fire and overutilization by livestock. Continued livestock and wild horse use would maintain the status quo, both in the short and long term. Climatic conditions would continue to have a direct major impact on chukar populations (cold, wet seasons are detrimental to young chukar).

NONGAME BIRDS

Vegetation, particularly important habitats such as aspen and cottonwood groves, riparian areas and meadows, would all continue to decline in quality and quantity. This would negatively impact nongame birds in that structural diversity would continue to decline with a loss in bird numbers and species. The actual amount of bird species or population losses cannot be estimated without indepth studies. However, some of the most productive areas of nongame habitat would be reduced severely or eliminated entirely causing nongame bird populations to decline further (Thomas, 1979).

WILD HORSES

Under this alternative wild horses would not be increased and livestock use would continue at present levels.

Upon request by private land owners, wild horses would be removed from a portion of the Pine Nut HUA, all of the Jumbo HUA, and all of the Pah Rah HUA (Table 1-4 and Chapter 3, Proposed Action and Maximization of Livestock alternatives).

Although no wild horses have been removed from the Flanigan Herd Area due to a court injunction, the injunction has been lifted and horse removal will begin in the future. These numbers will be reduced to the level shown in the approved Flanigan Horse Management Plan.

In many of the allotments with wild horses and domestic livestock, utilization studies have shown an overuse of available forage. These areas would require wild horse reductions as domestic livestock levels would remain unchanged. Negative impacts will occur due to the fact that horse numbers could be reduced below viable herd levels and total loss of the resource could happen.

Under this alternative the wild horse numbers would be reduced much lower than in the Proposed Action because vegetation condition would decline and wild horses would face the possibility of die-offs during severe periods of weather due to poor levels of nutrition as occurred in the Buffalo Hills HUA in the Winnemucca BLM District in 1977.

RECREATION

Under this alternative there would be little impact on recreation, except for activities associated with wildlife and riparian habitat, where wildlife numbers and hunting opportunities would decline.

LIVESTOCK GRAZING

Under this alternative, livestock use would continue at present levels in the short term (Table 1-1).

Over the long term, poor distribution patterns would result in areas of overutilization and a decline in availability and quality of forage. This in turn would reduce calf and lamb crop percentages and calf and lamb weaning weights and weights for marketable lambs. The result could be that many permittees would have to reduce the amount of public land grazing (Wallace & Foster, 1975).

This impact is based on the assumption that at the present time there is only a minimal amount of management planning on most of the area allotments.

Livestock operations may continue to be productive over the short term, however, without more intensive management, planning and vegetation monitoring, vegetative vigor and condition will deteriorate eventually resulting in poor condition of livestock. This will also bring a decrease in income and a loss of the permittees who are at or near a marginal income area (Economic Impacts, this alternative).

Continuing stocking rates at the current levels would mean that much of the forage consumed would be annuals. Since annual growth is almost completely dependent on climate, during years of poor annual production more pressure would be placed on the perennials. This would mean loss of perennials and an increasing amount of annuals (Martin, 1972). As the range resource became more of an annual type, livestock permittees could no longer depend on a base herd and would have to fluctuate their stocking rates (Herbel & Nelson, 1969).

ECONOMIC IMPACTS

The analysis for this alternative is based on the assumption that the ranchers would adjust their public land grazing in response to long term changes in vegetative production (Appendix L, Section 1).

As Table 3-2 indicates, most of the ranches could continue near current use levels, especially in the seasonal use cattle ranch categories. These account for 70 percent of the active ranches. The yearlong cattle ranches would probably have to make major changes in their operations in order to avoid the projected income reductions. Sheep ranches may be able to continue operating at a reduced level, but if current trends continue, the typical ranch could expect to lose an annual average of $26,000, about 45 percent of the current income of $57,000.

Overall annual losses to the ranching sector could total about $400,000 in the long run. This represents about 25 percent of the current income of the public land ranches in the Reno area. In addition, 25 jobs could be lost.

Regional earnings could decline by about $1 million including the multiplier effect. This could result in a loss of 70 jobs. The capital value of the ranches could also decline. This cannot be quantified with current data since grazing allotments are valued at the active preference level of AUMs, which would remain constant for this alternative. It is likely that the value per AUM would decline in response to the projected decline in grazing quality.

The projected decline in mule deer populations would result in a reduction in hunting related income (i.e., expenditures for ammunition, deer tags, etc.). Due to lack of data, this cannot be quantified. Other nonquantifiable losses in the value of non-consumptive wildlife uses could occur.

SOCIAL ANALYSIS

All individuals and groups interview considered *reasonable* management of public lands a positive attribute. Active participation in all phases of management by those concerned was emphasized. All the parties agreed that *management* was necessary; the concept of *no action* does not mean *no management*.

RANCHING COMMUNITY

Those ranchers interviewed reacted positively to the concept of this alternative. However, while they expressed relief that they would not see any livestock reductions under this alternative, they felt that this would adversely impact their business over a period of time. They felt that new range improvements were needed on their allotments; water developments were specifically mentioned. Although the maintenance of existing facilities was approved, there was a general feeling that non-development would, in a sense, curtail their opportunities for future improvement of their ranching operations.

STATE AND NATIONAL

The recreation, wildlife and wild horse groups expressed concern about this alternative. They advocate rehabilitation and protection of the rangeland. They expect that this alternative would result in a continued deterioration of the rangeland. They feel that a disproportionate emphasis on the livestock industry will adversely impact the existence and appreciation of wildlife, wild horses and recreation opportunities.

Impacts to the ranching community would be minimal. The only drawback would be the lack of range improvements, which are favored by this community.

MAXIMIZATION OF LIVESTOCK ALTERNATIVE

SOILS

The impacts of this alternative would be the continuation of increased erosion, flooding and sedimentation in areas where heavy use by livestock will occur. However, once the proposed range improvements are implemented in Category I allotments (Table 1-5), the degree of impact would be

TABLE 3-2
RANCH ECONOMIC IMPACTS
NO ACTION ALTERNATIVE

	CATTLE			SHEEP
	YEARLONG	SUMMER USE HIGH DEPENDENCY	SUMMER USE LOW DEPENDENCY	
Herd Size (cows/ewes)	380	240	470	2,980
Public Land AUMs	1,360	750	180	360
Gross Revenue	$ 81,000	$56,000	$129,000	$171,000
Total Costs	75,000	38,000	91,000	128,000
Net Ranch Proprietors Income	6,000	18,000	38,000	31,000
Change from Present	-28,000	-2,000	-	-26,000
Net Labor and Proprietors Earnings	12,000	23,000	49,000	61,000
Change from Present	-43,000	-2,000	-	-40,000

Totals may not add due to rounding.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, 1981.

less. In the long term proposed seedings will help ease utilization on native range resulting in less erosion and sediment damage.

WATER QUALITY

Under this alternative waters that exceeded the water quality standards are expected to continue in a downward trend. Unprotected waters that passed the standards, but would be subject to increased use by livestock, would be expected to degrade in quality at an increased rate.

VEGETATION

ECOLOGICAL CONDITION, FORAGE CONDITION AND TREND

Ecological condition, forage condition and trend will improve in manner, rate and degree comparable to the Proposed Action. These improvements will result from desirable changes in plant species composition, production, cover, density, vigor and vitality within the Category I allotments, and within the Category M and C allotments which currently have upward trend (Table 2-4).

The results of the methodology for predicting future changes in vegetation condition, as discussed in the Proposed Action, Appendix E, Section 2 and Appendix F, indicate the overall shift in ecological condition on native range will be as follows: (1) excellent condition will increase by 2,991 acres; (2) good condition will increase by 27,837 acres; (3) fair condition will decrease by 12,476 acres; and (4) poor condition will decrease 18,352 acres. A total of 47 percent of the EIS area will be in poor ecological condition. Similar changes in forage condition on existing seeded range will occur with the following results: (1) excellent condition and good condition will increase 15 and 374 acres, respectively; (2) fair and poor forage condition will decrease by 289 and 100 acres, respectively (Appendix F, Table 1-5 and 1-6).

Upward trend will increase 415,315 acres within Category I allotments.

The rate and degree of improvement indicated above is based on the assumption that in addition to management and treatments proposed in this alternative, utilization study methods will be modified as described in Appendix E, Section 1.

Management under this alternative will include AMPs and range improvements (e.g., seedings, pipelines, fences, etc.) in Category I allotments, removal of wild horses, management for reasonable numbers of mule deer, and following CRMP, possible adjustments in periods-of-use and grazing intensity. It is expected that most of these management actions will be the same or very similar to those of the Proposed Action. Therefore, the impacts and benefits for the Maximization of Livestock alternative should be very similar to those discussed under the Proposed Action.

Impacts expected from possible changes in periods-of-use will include key management species increasing their vigor and vitality, thereby improving species composition. Implemented AMPs, with tailored grazing systems, will provide periods-of-rest for key plant species during their critical growth cycles. This protection will result in increased vigor, vitality, seedling establishment, and production of the desirable climax plant species and seeded species.

As discussed in the Proposed Action, AMPs are proposed for Category I allotments only. Monitoring plans will be developed for Category M, I and C allotments. Based on monitoring results, more intensive managment actions may be implemented in the future to improve vegetation condition and trend. This possibility, plus the assumption of an improved approach in utilization studies (Appendix E, Section 1) was the basis for predicting some improvement in ecological and forage condition in these allotments (Appendix E, Section 2 and Appendix F, Table 1-5).

Other improvements include 13,313 acres of sagebrush control, followed by seeding of a mix of desirable plant species, which will provide an increase of approximately 3,600 AUMs within 10 years (Chapter 1, Table 1-5, and Appendix G, Section 1). The increase in AUMs available in seeded pastures will help relieve overutilization on native range. This will facilitate increased vigor and vitality of key species and improved ecological condition and trend.

Removing all of the wild horses will result in additional AUMs becoming available for livestock. This will result in a change in the type of grazing animal only, not the number of AUMs used. However, the removal of wild horses followed by the allocation of all available AUMs to livestock based on actual use and utilization studies will more closely approximate correct vegetation utilization levels. The vegetation resource will benefit from the reduced grazing pressure and the increased control of periods-of-use and distribution when only livestock are present. It is expected, however, that current utilization study results and methods of measuring grazing intensity for the purpose of adjusting stocking rates to proper levels, will result in less than optimum management for improving vegetation condition and trend. Plant vigor, vitality and seedling survival will improve slowly in the different plant communities.

Under this alternative, the net result expected will be a slow improvement in ecological condition, forage condition and trend, until revised monitoring procedures can be implemented, resulting in further improvements in the vegetation resource. Again, the rate of improvement in vegetation condition and trend expected in this situation would be the same or very similar to the Proposed Action (Appendix E, Section 1).

In summary, the management actions and rangeland improvements proposed in the Category I allotments, and the less intensive management actions which may occur in all allotments as a result of the CRMP process and monitoring studies, will all serve to improve the vegetation resource. With revision of monitoring and study procedures (Appendix E, Section 1), the overall result will be a five percent increase in good and excellent ecological condition, a four percent increase in good forage condition, an addition of 3600 AUMs from seedings, and improved trend over 63 percent of the EIS area (Appendix F, Table 1-5 and 1-6; Appendix G, Section 1).

RIPARIAN AND ASPEN COMMUNITIES

As detailed in this same section of the Proposed Action, the only management action which will have a significant impact on riparian habitat is fencing. Grazing systems would improve condition and trend on upland ranges, but do little more than slow deterioration of riparian habitat. Reduction of grazing pressure will help improve upland range, but will provide minimal relief to riparian areas where livestock tend to congregate. In this alternative, as in the Proposed Action, 183 acres of overutilized riparian habitat is proposed for protection by fencing (Table 1-5). The unprotected riparian areas will have minimal improvements in vegetative production and cover as a result of grazing systems providing some rest from livestock use, but fenced riparian habitat will have complete rest. It is expected that with the implementation of this alternative the riparian habitat, much of which will be fenced, will improve significantly in condition within 10 years. The result of proposed management and rangeland improvements, including the revision of monitoring and study procedures (Appendix E, Section 1), on the ecological condition of the riparian habitat will be an eight percent decrease in poor condition, a three percent decrease in fair condition, and a 10 percent and one percent increase in good and excellent condition, respectively. Plant species diversity and production would improve, resulting in increased erosion control and improved habitat for all uses.

Impacts and benefits derived from this alternative for critical aspen habitat will be very similar to those outlined for the Proposed Action, Riparian and Aspen section of Chapter 3. In summary, aspen root sucker survival, stand perpetuation and ecological condition will improve as a result of reduced grazing intensity and periods-of-rest. The rate of improvement will be equal to that discussed for the Proposed Action. The additional AMPs and implied grazing systems proposed under this alternative will be responsible for the increase. Thus, with the management and improvements proposed, including the revision of monitoring and study procedures (Appendix E, Section 1), ecological condition will improve as follows: poor condition will decrease six percent, fair condition will increase two percent, good condition will increase three percent, and excellent condition will increase one percent (Appendix E, Section 2 and Appendix F). Although the aspen habitat type makes up a very small percentage of the total acres of the EIS area, it is very critical habitat. The improved vegetation condition, reproduction survival, and stand perpetuation must be considered significant.

WILDLIFE

Several assumptions are necessary for an evaluation of this alternative: (1) wildlife habitat improvements would be allowed (Table 1-5); (2) bitterbrush would be identified as a key vegetative species on those allotments encompassing key deer winter range; (3) bitterbrush would be managed under a grazing system (such as outlined by A.L. Hormay) which enhanced plant vigor, reproduction, and young plant survival; (4) proposed range improvements for livestock would be coordinated through CRMP; (5) livestock stocking rates would not exceed total preference and (6) all wild horses would be removed. All of these assumptions, if implemented, would aid in enhancing wildlife habitat to some degree. If none were implemented, all wildlife species would significantly decline over the long term, and mule deer and sage grouse populations would be most severely impacted. Impacts to Category M and C allotments would be similar to the No Action Alternative.

MULE DEER

The only specific habitat improvement identified for mule deer is an anchor chaining of 250 acres of pinyon-juniper and rechaining of the old Como area chaining in the Churchill Canyon allotment (MFP 2, 1981). This would only be done if the woodland products program for harvesting trees on these areas was not deemed successful after a one year trial period. According to professional judgement, if these areas were chained or rechained and seeded, proper experience has shown a carrying capacity of two acres per AUM for mule deer could be achieved after a three to five year growing period without use by domestic livestock. Therefore, the potential exists for an increase of more than 50 percent in mule deer numbers. This is based on a use rate of 60 deer days (two deer months) use per acre on the chaining.

The development and implementation of rest-rotation grazing systems using bitterbrush as the key species would present the most desired results, as better quality deer forage would be available in the long term to help meet reasonable number demands. Such systems would markedly enhance bitterbrush growth and reproduction on the following Category I allotments: Antelope Mountain, Winnemucca Ranch, Constantia, Plumas Station, Paiute Canyon and Flanigan. The result would be that reasonable number goals would probably be met in Category I allotments at some time in the future. The length of time it would take to meet reasonable numbers would be determined by the rate at which allotment management plans were developed and implemented.

The same comments made under other alternatives about protecting small habitats, particularly aspen and cottonwood groves and meadows would also apply to this alternative. This is particularly true where the quality and quantity of forage, particularly for lactating does, is considered.

All of the comments for mule deer are based on the assumptions as stated at the beginning of this section. If none of the proposed habitat improvements were implemented (Table 1-5), nor bitterbrush recognized as a key species and managed as such, then the problems identified in Chapter 2 (lack of bitterbrush seedling survival, lack of forbs, etc.) would continue to the detriment of existing mule deer populations.

SAGE GROUSE

Most of the comments made for mule deer generally apply to sage grouse as well. If the improvements shown in Table 1-5 are implemented and grazing systems that consider forbs are developed, populations should increase significantly as more succulent, nutritious vegetation and insects become available. Category I allotments listed in the proposed action discussion for sage grouse would also apply here.

If none of the improvements are implemented, sage grouse would eventually decline because of continued overuse of meadows by livestock. There would not be enough high nutrition forage, especially forbs, plus the insects associated with these to sustain existing populations.

CHUKAR

Chukar would continue to survive and populations would increase as under the Proposed Action.

NONGAME BIRDS

Since most nongame birds depend on small but key habitats such as tree clumps and areas of surface water at least part of the year, their populations would do best if many of the key habitats were fenced to maintain vegetative structural diversity. Under a worst case scenario, many of these key areas would be eliminated over the long term since no reproduction was taking place (as in aspen and cottonwood clumps). With the decline of habitat both species and numbers of nongame birds would also decline.

WILD HORSES

Under this alternative wild horses would be completely removed from the EIS area. As a result, a number of wild horses would be injured or would die in a given capture process (i.e., water trapping, winged corral and helicopter use). The method used for gathering the wild horses would be determined as part of the Capture Plan. Also, some horses would die at the holding facilities. Another consideration would be destroying those wild horses that are not adoptable due to age, health, etc. These are all unavoidable adverse impacts directly related to capturing and holding wild horses. During the capture operation there could also be injuries to the capture crew and/or to their horses.

Although this would significantly reduce competition for vegetation in the wild horse use areas there would be no change in those areas where wild horses are not presently found.

This action would be a significant adverse impact as the total wild horse resource would be lost.

RECREATION

A significant impact would occur with the removal of all wild horses as viewing opportunities would not be available to a large number of people.

Additional range improvements would be anticipated in presently undeveloped semi-primitive non-motorized opportunity areas. This could result in a loss of non-motorized recreation opportunities throughout the EIS Area. This loss is considered significant because of the large population in Reno and Carson City which has indicated a desire to recreate closer to home (SCORP Update, 1981).

LIVESTOCK GRAZING

Under this alternative livestock numbers would remain at present use levels (Table 1-1) until wild horses are removed.

As wild horses are removed and range improvements and land treatments are implemented (Table 1-5), available livestock forage could increase significantly (Summary Table 1-1).

Category I allotments under this alternative would be the same as shown in the Resource Protection alternative (Table 1-7A and 1-7B). Some additional range improvements could be possible under this alternative, but would be limited primarily to fencing and water developments. However, 6658 acres of additional seedings or other vegetation manipulation would be done. This would mean an additional 2842 AUMs would be available for livestock use at some time in the future. The very nature of the climate in the EIS area makes such vegetation changes difficult. Costs for such projects are also an important factor, limiting them perhaps more than any other.

Although calf and lamb crops, weaning weights and livestock use could increase under this alternative, the increase would be gradual and would be limited by economic constraints, such as market demands, operating costs and local real estate development, rather than by available public lands. Although no significant impacts to livestock grazing would initially occur, no measureable benefits could be gained for quite a few years. To gain a significant increase in livestock numbers would probably require ten years or more (Economic Impacts, this alternative).

ECONOMIC IMPACTS

Under this alternative some of the ranches could expect to lose income in the short run but many would be unaffected. In the long run, most ranches could expect a substantial increase in income.

As Table 3-3 indicates, in the short run the yearlong and high dependency cattle ranch models project losses of $12,000 and $4,000 respectively from current income. No change is projected by the low dependency cattle ranch model. The sheep ranch model projects a loss of $5,000. Overall losses to the ranch sector could total $200,000 and about ten full-time equivalent jobs. This could result in an annual loss of regional earnings of about $450,000 including the multiplier effect. Regional employment could decline by 30 jobs.

In the long run, all of the models project increased incomes, ranging from an increase of $3,000 on the typical low dependency cattle ranch to an increase of $15,000 on the typical yearlong cattle ranch. Overall ranch sector earnings could increase by $300,000. Another 15 ranch jobs could be added. On a regional basis earnings could increase by $700,000 including the multiplier effect. This could increase regional employment by 50 jobs.

This alternative could also result in changes in the market value of grazing allotments. Very little change is expected to occur in the short run amounting to a decrease of $20,000. In the long run, market value could increase by $600,000.

If reasonable numbers of mule deer are achieved on Category I allotments, regional earnings derived from hunting expenditures could increase by about $15,000 including the multiplier effect (Appendix L, Section 5). Changes in earnings from other wildlife related expenditures (from hunting other species, sightseeing, photography, etc.) as well as non-monetary wildlife values (i.e. existence values) could also occur. These are not quantifiable due to lack of data.

SOCIAL ANALYSIS

RANCHING COMMUNITY

This alternative was favorably received by those ranchers interviewed. Benefits derived from this alternative would enable the ranchers to maintain and improve their preferred lifestyle. The adjustments such as long term increase of AUMs, changes in periods-of-use and necessity for loca-

TABLE 3-3
RANCH ECONOMIC IMPACTS
MAXIMIZATION OF LIVESTOCK ALTERNATIVE

	CATTLE			SHEEP
	YEARLONG	SUMMER USE HIGH DEPENDENCY	SUMMER USE LOW DEPENDENCY	
SHORT TERM				
Herd Size (cows/ewes)	540	220	475	3,800
Public Land AUMs	2,500	600	210	1,900
Gross Revenue	$116,000	$52,000	$129,000	$216,000
Total Costs	93,000	36,000	91,000	164,000
Net Ranch Proprietors Income *	22,000	16,000	38,000	53,000
Change from Present	-12,000	-4,000	-	-5,000
Net Labor and Proprietors Earnings	36,000	20,000	49,000	95,000
Change from Present	-19,000	-5,000	-	-7,000
LONG TERM				
Herd Size (cows/ewes)	810	280	490	4,350
Public Land AUMs	5,350	1,280	390	2,790
Gross Revenue	$175,000	$65,000	$134,000	$249,000
Total Costs	126,000	41,000	93,000	180,000
Net Ranch Proprietors Income	49,000	24,000	41,000	69,000
Change from Present	+15,000	+4,000	+3,000	+12,000
Net Labor and Proprietors Earnings	78,000	30,000	53,000	120,000
Change from Present	+23,000	+5,000	+4,000	+18,000

* Totals may not add due to rounding.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, 1981.

tion of alternate feed sources were not felt to be a problem.

STATE AND NATIONAL

This alternative evoked a great deal of negative response from the wildlife, wild horse and environmental protection groups. They felt that this would result in extreme deterioration of the rangeland. This in turn would adversely impact the perceptual, recreational and general use of the public lands.

Long term impacts to the ranching community were considered beneficial and this alternative was favorably received by the livestock industry. Wild horses, wildlife and recreation would seriously be impacted because of anticipated deterioration of the habitats and rangeland.

RESOURCE PROTECTION ALTERNATIVE

SOILS

The impacts of this alternative will approximate those for Category I of the Proposed Action, with expected decreases in erosion, flooding and sedimentation in areas where additional improvements are proposed, and management systems will be implemented.

WATER QUALITY

Under this alternative, the impacts would approximate those under the Proposed Action Category I management system. The proposed changes in periods-of-use, and the improvements for the protection of springs, streams and riparian habitat, are expected to improve the quality of the waters that will be protected.

VEGETATION

ECOLOGICAL CONDITION, FORAGE CONDITION AND TREND

It is expected that this alternative will provide significant improvement in ecological condition, forage condition and trend as a result of the periods-of-use, grazing systems, and stocking rates proposed. These improvements will develop with increases in plant species composition, production, cover, density, vigor and vitality.

The change in ecological condition, forage condition and trend was predicted in the same fashion as in the Proposed Action (Appendix E, Section 2 and Appendix F). The expected improvement in ecological condition on native range will include an increase of 3,994 acres in excellent condition, an increase of 33,934 acres in good condition, a decrease of 11,752 acres in fair condition, and a decrease of 26,203 acres in poor condition. Forty six percent of the EIS area will be in poor ecological condition. Similar improvement in forage condition on existing seeded range will occur with the following results: excellent condition will increase by 207 acres, good condition will increase by 299 acres, and fair and poor condition will decrease by 352 and 154 acres, respectively. Upward trend will increase from 43,649 acres to 551,916 acres as a result of management actions proposed in Category I allotments.

The rate and degree of improvement indicated is based upon the assumption that in addition to the management and treatments proposed, utilization study methods will be revised as described in Appendix E, Section 1.

Under this alternative management for these improvements will include proposed periods-of-use for all Category I allotments (Table 1-8), AMPs and range improvements (eg., seedings or fencing of riparian habitat) for all Category I allotments and adjustments in livestock and wild horse use within five years based on the proper use indicated by existing utilization studies.

Under this alternative, the proposed periods-of-use for the Category I allotments will be selected for the benefit of the key plant species physiological needs. The revised periods-of-use will allow the key species to build carbohydrate reserves and increase their vigor and vitality, thereby increasing percent composition of desirable species in plant communities. This will result in improved ecological condition and trend on native range and improved forage condition and trend in seedings.

Under this alternative, 11 Category C allotments will be moved to Category I in addition to the 10 Category I allotments addressed in the Proposed Action (Table 1-7A & 1-7B), and will have AMPs and grazing systems developed and implemented. Ecological condition, forage condition and trend would benefit from the implementation of grazing systems as a result of increased production, cover, vigor and vitality of desirable climax plant species and seeded species.

As discussed in the Proposed Action, AMPs are proposed for the Category I allotments only. Monitoring plans will be developed for Category M, I and C allotments. Based on monitoring results, more intensive management actions may be implemented in the future to improve vegetation condition and trend. This possibility, plus the assumption of an improved approach in utilization studies (Appendix E, Section 1) was the basis for predicting some improvement in ecological and forage condition in these allotments (Appendix E, Section 2 and Appendix F, Tables 1-7 and 1-8).

Category I allotments would have springs, pipelines, fences and sagebrush control/seedings developed. These new improvements would improve livestock distribution and facilitate grazing systems. The 6,655 acres of sagebrush control and seeding would provide an additional 1,700 AUMs approximately within 10 years. The impacts and significance of these improvements would be a reduction of grazing pressure on native range due to increased AUMs within 10 years, periods-of-rest for desirable climax plant species and seeded species as a result of grazing systems, and an improvement in ecological condition and trend in the future (Appendix E, Section 2 and Appendix G, Section 1).

Use of current utilization and actual use study results and methods of measuring grazing intensity manage more for present ecological condition (Appendix E, Section 1). Proposed periods-of-use, grazing systems, adjustments in livestock and wild horse numbers within five years of implementation, and range improvements as proposed in this alternative will have an impact of improving ecological condition, forage condition and trend. However, until revised monitoring procedures can be implemented, the rate of this improvement will be slow.

For the purpose of analysis it is assumed that the methods of measuring grazing itensity will be modified in the range monitoring program to include utilization studies based on range sites and proper use factors (for key plant species) which more closely approximate the utilization the key plant species should receive in the good or excellent ecological condition plant communities (Appendix E, Section 1). This improved approach in monitoring and management in all allotments will speed improvement of ecological condition, forage condition and trend. The rate of improvement will exceed the results of all other alternatives. In summary, ecological and forage condition will improve significantly; good and excellent ecological condition will increase six percent while good and excellent forage condition will increase five percent. Trend in the upward category will increase 508,267 acres, showing improvement over 77 percent of the EIS area (Appendix F, Table 1-7).

RIPARIAN AND ASPEN COMMUNITIES

Impacts to the riparian habitat in this alternative are expected to be the same as those described in the Riparian and Aspen section of the Proposed Action. Most riparian areas will be protected through fencing in this alternative. Livestock and wild horses are expected to overutilize this habitat, regardless of grazing systems or reductions in livestock and wild horse numbers, before making use of upland range (Dahlem, 1979 and Behnke and Raleigh, 1978). With protection by fencing, 183 acres of riparian habitat will improve significantly within 10 years. The result of proposed management and rangeland improvements, including the revision of monitoring and study procedures (Appendix E, Section 1), on the ecological condition of the riparian habitat will be an eight percent decrease in poor condition, a three percent decrease in fair condition, and a ten percent and one percent increase in good and excellent condition, respectively. Plant species diversity and production will improve, just as in the other alternatives, resulting in increased erosion control and improved habitat.

For the critical aspen communities the impacts derived from this alternative will be very similar to those outlined in the Riparian and Aspen portion of the Proposed Action. The establishment of grazing systems will allow rest periods for key management species, thereby benefiting root sucker survival. Plant species composition and production on other upland range will improve, and this in turn will benefit aspen reproduction and stand regeneration. Reductions in grazing intensity, proposed periods-of-use, and improved livestock distribution will result in improved aspen root sucker survival and the perpetuation of existing stands. As monitoring and study procedures are revised (Appendix E, Section 1), an action which will compliment proposed management and rangeland improvements, ecological condition of this habitat type will improve more rapidly. Poor ecological condition will decrease six percent, fair condition will increase two percent, good condition will increase three percent and excellent condition will increase one percent (Appendix E, Section 2 and Appendix F).

Some declines in availability of the vegetation resource for livestock grazing will be expected to result from the Resource Protection alternative. Initial reductions in livestock and wild horse numbers, and implementation of periods-of-use will reduce grazing pressure on many allotments. If utilization studies and grazing intensities are modified to manage for good or excellent ecological condition, then the reduction in grazing pressure on many allotments will be even more significant. Another temporary reduction will result from the two years rest new seedings will require. After the AMPs have been implemented and operational for several cycles, vegetation ecological condition, forage condition, trend and productivity will be expected to increase.

WILDLIFE

Under this alternative, those allotments that could go to Category I are discussed (Table 1-7A and 1-7B). There would be no change from the existing situation for Category M and C allotments.

It is assumed that all proposed habitat improvements (Table 1-8) would be implemented, and key areas such as meadows, tree groves and waters which are identified in URA 3 for protection would be fenced.

MULE DEER

Each allotment in Category I will be commented upon in turn as it affects mule deer.

Based on professional judgment, under this alternative mule deer would increase from existing to reasonable numbers (Table 1-7A & 1-7B) over time if the following concepts were incorporated into allotment management plans for the allotments discussed in this section: (1) bitterbrush would be identified as a key vegetative species and would be managed to follow principles as outlined by A.L. Hormay; (2) deferring grazing in higher elevation areas will give all plants, not just shrubs a chance to restore vigor, grow and set seed; (3) each allotment must have its own grazing management plan, developed through the CRMP process, which takes into account the high and low country and key deer habitat; (4) in allotments where sheep are grazed, herders should be an integral part of management plans developed for sheep and allotments; (5) wild horse numbers will remain the same or be reduced from existing populations and (6) implementation of the improvements shown in Table 1-8 will be done.

As noted above, existing mule deer numbers would increase to reasonable number goals as a result of increased forage, including bitterbrush, and improved nutrition provided by adequate forbs, formed under aspen patches and in meadows. Also, bitterbrush seedling survival should improve, with a resulting long term maintenance of bitterbrush stands.

The Winnemucca Ranch allotment affects parts of key deer yearlong habitat (Fort Sage Mountain) and key deer winter range (Virginia Mountains and Seven Lakes Mountain). The delay of cattle turn out until July 15 would protect shrub species and allow them to go to seed, as well as protecting forbs on open range and upland meadows. Fencing would be essential for protection of these higher elevation areas. In addition, livestock should be out of the higher country by the end of October to prevent direct competition for forage with mule deer.

In the Flanigan Allotment a fence on the northern flank of Fort Sage Mountain would protect it until the turnout date of July 15.

The Paiute Canyon Allotment covers all of the key deer winter area of the Dogskins and the southern half of the key deer winter area in the Virginia Range. A July turn out date would benefit mule deer if cattle were moved from the mountains by the end of October.

The Constantia Allotment is almost entirely key deer winter range. The July to October on-off dates would be optimum for mule deer.

Antelope Mountain Allotment contains key deer winter range at fairly low elevations in the Sand Hills, and the area between these and Petersen Mountain. Cattle should not be permitted until mid to late June, and should come off by October 15 to protect vegetation.

Plumas Station Allotment east of U.S. Highway 395 is key deer winter range and would provide the most forage for wildlife, vigor and seed production for bitterbrush, if left ungrazed until mid-July. The proposed late October gathering date would be beneficial to mule deer.

Big Canyon Allotment, while it does not have key deer range, does support deer yearlong with added numbers in the winter. Habitat would benefit most by deferring grazing until mid-July.

The remainder of the allotments in the northern portion of the EIS area, Spanish Springs, Mustang, Olinghouse and White Hills, do not have key deer winter or yearlong areas. Periods-of-use will have little or no effect on mule deer on these allotments.

The Jumbo Allotment supports deer yearlong with increased numbers in the winter. The proposed dates in Table 1-7A would be beneficial.

The southern allotments include all those not mentioned above. The following allotments support few or no deer, with no key deer areas and will not be discussed, these include: Rawe Peak, Gold Hill, Duck Hill, Kings Canyon and Clifton.

Buckeye Allotment has key deer winter range in the south end, just east of the Carter Station Allotment and Hot Springs Mountain. Sheep grazing on these areas, if deferred until after June 1, would benefit mule deer by giving browse, particularly bitterbrush, a rest during the early part of the growing season and would improve plant vigor.

Churchill Canyon Allotment has a small strip of key deer winter range at its southern end which would benefit by having grazing deferred until after June 1, and periodically rested.

About 85 percent of the Pine Nut Allotment is identified key deer summer range. The proposed periods-of-use would be beneficial except for November, unless sheep in this period were grazed at lower elevations in the western portion of the allotment.

The Sunrise chaining and surrounding area at the east portion of the Sunrise Allotment is key deer summer range. Key deer habitat would benefit most if cattle were deferred until after June 15 to allow for growth of bitterbrush and other browse species.

The northern half of the Hackett Canyon Allotment is key deer winter range. Direct competition between deer and sheep for feed would be reduced or eliminated if the grazing date for this area was deferred until March 1 at the earliest.

SAGE GROUSE

Based on professional judgment, sage grouse populations could increase by at least 100 percent if the proposed habitat improvements in Table 1-8 and livestock grazing systems were implemented. The results of these range improvements and livestock grazing systems would be increased forage (forbs), including insects on the meadows and around waters.

CHUKAR

This species would benefit less than other wildlife because it thrives on overgrazed range where vegetation is not abundant. Overall vegetation on the Category I allotments would become more abundant under this alternative, so chukar populations would either decline in the short term or remain stable. In the steep portions of Churchill Canyon and Mustang allotments, vegetative conditions probably would change little over time and chukar populations in these areas would either remain the same or increase slightly.

NONGAME BIRDS

This group of wildlife would benefit tremendously if the grazing management and small habitat protection jobs mentioned above were implemented, because vegetative structural diversity and free water would be maintained. Based on professional judgment it is probable that aspen and cottonwood groves would support more nongame bird numbers (and perhaps species as well) if the vegetative understory beneath the trees was allowed to grow without being grazed or trampled into the ground every year.

WILD HORSES

Under this alternative wild horses would be significantly reduced in all areas where they occur.

The requirement to remove wild horses from private lands would still exist. These adjustments would decrease total wild horse demand from 15,367 AUMs to 10,374 AUMs. Initial wild horse adjustments would be prorated with adjustments in livestock as part of land use planning and CRMP. However, future adjustments on the allotments concerned could be borne by the wild horses, if utilization of forage increased past the 50 percent proper use level. There would be a significant impact to wild horses under this alternative, and horse numbers could be reduced below a viable herd level with a resultant loss of the total resource (Wild Horses, Maximization of Livestock alternative).

RECREATION

Impacts would be similar to the Proposed Action.

LIVESTOCK GRAZING

Under this alternative livestock numbers would be reduced to the proper use levels indicated by existing utilization studies over a five year period. Within those allotments that were part of Category I of the Proposed Action, there is an adjustment from 31,861 AUMs to 16,353 AUMs (Table 1-7B). This would have significant economic impacts on the permittee (Economic Impacts, this alternative).

Future use would be based on a combination of monitoring programs, grazing systems, vegetation condition and potential, range improvements and CRMP. As rangeland improves and more forage becomes available, additional livestock use could be permitted (Summary Table 1-1).

Proper grazing systems would be designed for each allotment and tailored to livestock, mule deer and other resource management goals. This would be a beneficial impact to the vegetation resource as there would be periodic rest applied to key vegetation species (Vegetation Section, this alternative).

Range improvements would be as shown in Table 1-8. Some additional improvements could be made, however they would be limited to water developments and fences. Short term impacts to livestock numbers under this alternative would be far greater and considerably more severe than under the Proposed Action due to adjustments in numbers being based on utilization studies (Table 1-7B). In the long term there would be increased calf and lamb crops and higher weaning weights than in the Proposed Action.

The monies returned to the District from livestock grazing fees would be reduced as livestock use is adjusted. This in turn would limit range improvements as little appropriated funds could be expected under this alternative.

ECONOMIC IMPACTS

Under this alternative major short run reductions in income could occur on the ranches. In the long run the cattle ranches could be operating at near current levels but sheep ranches could still be well below current levels.

As Table 3-4 indicates, in the short run the yearlong cattle ranches could lose about $16,000 from their current annual income, a decrease of about 50 percent. Since all five of these ranchers would have allotments in Category I they would all be affected.

Also heavily affected would be the sheep ranches since four of the five ranchers would have allotments in Category I. The sheep ranch model projects a loss of about $16,000 from current income, a decrease of about 30 percent.

The summer use cattle ranches would be much less affected with no change expected for the low dependency group. In the high dependency group nine of the eleven ranchers have allotments in Category I. The model projects a loss of about $4,000 from current income for the typical ranch in this category, a decrease of about 20 percent.

Overall annual losses to the ranch sector could total $300,000 in income and 20 full-time equivalent jobs. This could result in an annual loss of regional earnings, including the multiplier effect, of about $750,000 and a loss of 50 jobs.

In the long run most of the ranches would have an increase in income above the short run, but would still be below current levels as indicated in Table 3-4. This is due in part to the limited herd size caused by restrictions on critical spring grazing.

Overall annual losses to the ranch sector could total about $200,000 in income and ten full-time equivalent jobs from the current level. Including the multiplier effect this could result in an annual loss of $400,000 of regional earnings and 30 jobs.

This alternative could also result in changes in the market value of the grazing allotments. These could range from a loss of $800,000 if no improvement is expected from the short run level to a loss of about $600,000 in the long run.

If reasonable numbers of mule deer are achieved in Category I allotments, regional earnings derived from hunting expenditures, including the multiplier effect, could increase by about $15,000 (Appendix L, Section 5). Changes in earnings from other wildlife related expenditures (from hunting other species, sightseeing, photography, etc.) as well as nonmonetary wildlife values (i.e. existence values) could also occur. These are not quantifiable due to lack of data.

SOCIAL ANALYSIS

RANCHING COMMUNITY

Under this alternative impacts would be similar to those of the Proposed Action. However, due to the possible adjustments required for livestock numbers, some ranchers fear they would be forced to seek other sources of income. The number of range improvements would also be limited, and so, in turn, would the positive gains to the rancher which contribute to the maintenance of a preferred lifestyle.

It is possible if condition of the rangeland trend improves significantly under this alternative, those ranchers who were not severely affected by the adjustments in livestock use would see an improvement in lifestyle and social conditions.

STATE AND NATIONAL

Implementation of this alternative could also require a reduction in numbers of wild horses. Wild horse interest groups see this as a deterrent to the opportunities to view and enjoy the wild horse in its natural habitat.

Wildlife and recreation groups view this alternative more favorably. Mule deer populations may increase from existing to reasonable numbers. This could increase both the consumptive and non-consumptive opportunities available to the general public.

TABLE 3-4
RANCH ECONOMIC IMPACTS
RESOURCE PROTECTION

	CATTLE			SHEEP
	YEARLONG	SUMMER USE HIGH DEPENDENCY	SUMMER USE LOW DEPENDENCY	
SHORT TERM				
Herd Size (cows/ewes)	490	220	475	3,350
Public Land AUMs	2,350	560	210	1,380
Gross Revenue	$105,000	$51,000	$129,000	$192,000
Total Costs	87,000	36,000	91,000	151,000
Net Ranch Proprietors Income *	18,000	16,000	38,000	41,000
Change from Present	-16,000	-4,000	-	-16,000
Net Labor and Proprietors Earnings	29,000	20,000	49,000	77,000
Change from Present	-26,000	-6,000	-	-24,000
LONG TERM				
Herd Size (cows/ewes)	600	220	480	3,410
Public Land AUMs	3,100	730	290	1,840
Gross Revenue	$128,000	$52,000	$131,000	$195,000
Total Costs	99,000	35,000	92,000	152,000
Net Ranch Proprietors Income *	30,000	17,000	40,000	43,000
Change from Present	-4,000	-3,000	+1,000	-14,000
Net Labor and Proprietors Earnings	46,000	21,000	51,000	80,000
Change from Present	-8,000	-4,000	+2,000	-21,000

* Totals may not add due to roundings.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, 1981.

UNAVOIDABLE ADVERSE IMPACTS

Under the No Action alternative, there will be continued accelerated erosion rates and subsequent soil loss. There will also be a continued increase in flooding and sedimentation damage in unprotected riparian and critical watershed areas. Water quality will continue to degrade over time.

Under all alternatives, excluding No Action, in the event that seedings are established before adjustments in livestock and wild horse use have been made, increased grazing by livestock and wild horses will continue in native range while protected seedings have become established. This increase in grazing demand on native range will slow improvement in ecological condition and trend.

Under all alternatives there will be continued overuse of unprotected riparian habitat by livestock and/or wild horses causing a decline in vegetation quality.

Under the No Action alternative, continued overutilization of vegetation from heavy stocking rates will result in continued deterioration of plant vigor and a decrease in desirable climax species, ultimately resulting in deteriorated range condition.

If competition for available vegetation between livestock, wild horses and wildlife continues at a high level, habitat quality would continue to deteriorate. This could effect the long term carrying capacity for mule deer which would gradually be reduced. Also, sage grouse and nongame bird populations would be similarly reduced over the long term.

Under all alternatives wild horse demand would fluctuate depending on management objectives. This would include complete removal under the Maximization of Livestock alternative. Whenever wild horses are captured and removed a number of them will be killed or injured during the capture process. Some of the horses would also die in the holding facility or if unadoptable, may have to be destroyed. Public viewing opportunities would also decline.

Under the Resource Protection alternative livestock utilization could be reduced approximately 40 percent in the short term.

Under the No Action alternative vegetative condition will continue to deteriorate resulting in reductions in calf and lamb crops and weaning weights. Also, wild horse numbers could be reduced below viable herd levels and face the possibility of die-offs during severe periods of weather.

Under all alternatives, the costs of running the livestock operations will continue to increase.

Direct and indirect income losses could average from $200,000 annually in the long term for the Resource Protection alternative, to $1 million for the No Action alternative. Direct and indirect employment losses could range from 30 jobs in the long term for the Resource Protection alternative to 70 jobs in the long term for the No Action alternative. The loss of ranch capital value could range from approximately $20,000 in the short term for the Maximization of Livestock alternative to approximately $1.2 million in the short term for the Proposed Action. Capital value losses could be even higher for the No Action alternative but can not be quantified due to lack of data.

RELATIONSHIP BETWEEN SHORT TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

After seedings have been established, a total of 47, 54, 47 and 46 percent of the EIS area will remain in poor ecological condition, under the Proposed Action, No Action, Maximization of Livestock and Resource Protection alternatives, respectively.

Under all alternatives, excluding No Action, there would be a short term minimal loss of vegetation due to construction of range improvements and land treatments.

Under all alternatives there would be no short term increase in mule deer numbers. In the long term mule deer are expected to reach reasonable numbers in Category I allotments only under the Maximization of Livestock and Resource Protection alternatives.

Under the Proposed Action and No Action alternatives short term utilization by wild horses would be existing demand. There would be no wild horse use in the short term under the Maximization of Livestock alternative. Under the Resource Protection alternative short term utilization by wild horses would be reduced by approximately 40 percent from existing demand. Long term utilization of wild horses would not change under the Maximization of Livestock and Resource Protection alternatives. There would be an approximate 37 percent reduction in wild horse use in the long term under the Proposed Action and No Action alternatives.

Under all alternatives, excluding Resource Protection, the short term utilization by livestock would be the last three years average licensed use. Under the Resource Protection alternative short term use would be an approximate 40 percent reduction from the other alternatives. There would be no change in livestock use in the long term under No Action. There would be an approximate 40 percent reduction in livestock use over the long term under the Proposed Action and an approximate 30 percent and 41 percent increase within the Maximization of Livestock and Resource Protection alternative respectively.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

There could be an irretrievable loss of direct ranch income and indirect regional income ranging from approximately $200,000 annually in the long term for the Resource Protection alternative to approximately $1 million annually in the long term for the No Action alternative.

Range improvement expenditures ranging from approximatley $800,000 for the Proposed Action to $1.4 million for the Maximization of Livestock alternative would be an irretrievable commitment of funds.

CHAPTER 4

LIST OF PREPARERS
CONSULTATION AND COORDINATION

CHAPTER 4

LIST OF PREPARERS

Tom Abbett - *recreation section*
B.S. (1969) Forestry and Outdoor Recreation from the University of Minnesota
Experience: 3 years as forester and 8 years as outdoor recreation planner with the BLM.

Cris A. Anderson - *soils and water quality sections*
B.S. (1978) Plant-Soil-Water Science from University of Nevada, Reno
Experience: 4 years with BLM Carson City District, soil scientist; 2 years SCS Soil Survey Party, 2 years resource specialist working on URA, EIS and special projects.

Phillip G. Anderson - *range and wild horse sections*
B.S. (1962) Animal Science from California State Polytechnical University
Experience: 1 year as range technician with U.S. Forest Service; 1 year as wildlife technician with California Department of Fish and Game; 4 years as range conservationist with U.S. Forest Service; 5 1/2 years as range conservationist with the BLM.

Lynda Armentrout - *sociology section*
M.A. (1973) Anthropology from Arizona State University
B.A. (1969) Sociology/Anthropology from Adams State College in Colorado
Experience: 5 years as archaeologist, 1 year as outdoor recreation planner with BLM.

Nancy Botti - *cultural resources section*
B.A. (1973) Anthropology from Stanford University, California
Experience: 1 year as archaeologist with the Tennessee Valley Authority; 1 year as archaeologist with Nevada State Museum; 6 years as archaeologist with the BLM.

William R. Brigham - *wildlife section*
B.S. (1964) Wildlife Management from Humboldt State University, Arcata, California
Experience: 1 year as range conservationist; 14 years as staff wildlife biologist for the BLM.

Linda Castillo - *Amtext Operator*
Experience: 1 year Amtext operator, BLM.

Frank D'Amore - *wilderness section*
B.S. (1973) Agriculture from University of Nevada, Reno
Experience: 5 years as outdoor recreation planner, 2 years as wilderness specialist with BLM.

Sharlene Davis - *Amtext Operator*
A.A. (1979) Cottey College, Missouri
Experience: 1 year Amtext operator, BLM.

Linda Hansen - *Editor*
A.A. (1972) Social Sciences from Imperial Valley College, California
Experience: 4 years as accounting technician, Imperial County, California; 6 years administrative work, DHEW; 1 year as personnel clerk, 1 year as editor for BLM.

Terry Knight - *Technical Coordinator*
B.S.F.S. (1970) International Affairs from Georgetown University
M.S. (Thesis in Progress) Outdoor Recreation and Land Use Planning, Colorado State University
Experience: 3 years as program analyst, Dept. of Health, Education and Welfare/Medical Services Administration, Summer Intern on the Public Lands staff of the Council on Environmental Quality; three years as wilderness specialist/outdoor recreation planner with BLM.

David Loomis - *economics section*
B.A. (1977) Economics from California State University, Chico. Graduate work at University of Nevada, Las Vegas and Reno
Experience: 4 years as regional economist with BLM.

Kelly Madigan - *Team Leader*
B.S. (1972) Range Management from California State University, Humboldt
Experience: 3 years as range conservationist; 2 years as environmental protection specialist; technical coordinator for Tonopah Grazing EIS; 1 year as environmental protection specialist (Chief, OP&EC) with BLM.

Susan Matthews - *cartography (NSO)*
Experience: 16 years of cartographic work with BLM.

Richard Schuler - *vegetation section*
B.S. (1975) Range Management from Washington State University
Experience: 1 year as range technician with U.S. Forest Service, Idaho; 3 1/2 years as range conservationist and 2 years as supervisory range conservationist with BLM.

M. Bashir Sulahria - *soils and water sections*
B.A. (1961) Humanities from Punjab University at Lahore, Pakistan
M.S. (1969) Watershed Management from University of Nevada, Reno
Ph.D. (1972) Hydrology from University of Nevada, Reno
Experience: 3 years as forest ranger with the Pakistan Forest Service in Pakistan; 3 years as water quality planner with Nevada's Department of Conservation and Natural Resources in Carson City, Nevada; 2 1/2 years as district hydrologist with the BLM in Carson City, Nevada. Publications: Co-author of 'Infiltration Studies on Non Wettable Soils on the East Side Sierra Nevada' presented at the International Symposium held at the University of California, Riverside (1968).

Elizabeth A. Warner - *Technical Coordinator*
B.S. (1977) Wildlife Management from University of Nevada, Reno
Experience: 5 years in clerical work; 1/2 year as natural resource specialist; 2 1/2 years as wildlife biologist and 6 months as technical coordinator for EIS with BLM.

Stephen A. Weiss - *public participation, Public Information Officer*
B.S. (1970) Resource Conservation from University of Montana
Experience: 5 years as outdoor recreation planner, Carson City and 1 year as environmental protection specialist/PIO with BLM.

CONSULTATION AND COORDINATION

AVAILABILITY OF THE DRAFT EIS

A summary of the Draft EIS will be sent to all agencies, organizations, companies and persons who have indicated an interest. Anyone who wishes a complete copy of the Draft EIS may receive one by contacting the Carson City BLM District at 1050 E. William St., Suite 335, Carson City, Nevada 89701, or by calling (702) 882-1631.

The following have received or will receive copies of the Reno Draft EIS Summary:

Bureau of Land Management

Office of Public Affairs
  18th and C Streets
  Washington, D.C. 20240
Nevada State Office
  300 Booth Street
  Reno, Nevada 89520
California State Office
  Fed. Bldg. Rm E-2841
  2800 Cottage Way
  Sacramento, California 95825
Battle Mountain District Office
  North 2nd and So. Scott Streets
  Battle Mountain, Nevada 89820
Las Vegas District Office
  4765 West Vegas Dr.
  Las Vegas, Nevada 89102
Tonopah Resource Area Office
  Bldg. 102, Old Radar Base
  Tonopah, Nevada 89049
Bakersfield District Office
  800 Truxtun Avenue, Rm 311
  Bakersfield, California 93301
Susanville District Office
  P.O. Box 1090
  Susanville, California 96130

FEDERAL AGENCIES AND LEGISLATORS

- Department of Agriculture
  - Agricultural Stabilization and Conservation Service, Reno
  - U.S. Forest Service, Toiyabe National Forest
  - Soil Conservation Service, Reno
- Department of Interior
  - Bureau of Indian Affairs, Stewart, Nevada
  - Bureau of Mines, Reno
  - Fish and Wildlife Service, Washington, D.C.
  - Geological Survey, Carson City and Reston, Virginia
  - National Park Service, San Francisco
  - Bureau of Reclamation, Lahontan Basin Projects Office
- Environmental Protection Agency
  - EPA, EIS Coordinator Region 9
  - Office of Federal Activities
- Senator Howard W. Cannon
- Senator Paul Laxalt
- Congressman James Santini

STATE OF NEVADA

- Office of the Governor
- State Planning Coordinator
- State Clearing House and State Agencies
- All State Senators and Assemblymen

OTHER ENTITIES

- Carson City District Grazing Advisory Board
- Carson City District Advisory Council
- Legislative Committee for Review of Federal Regulations
- Legislative Council Bureau
- Nevada Indian Commission
- South Tahoe Public Utilities District
- State Multiple Use Advisory Committee on Federal Lands
- State N-3 Grazing Board
- State Oil and Gas and Mining Advisory Board
- University of Nevada, Reno
  - Bureau of Mines and Geology
  - College of Agriculture
  - College of Arts and Sciences
  - Cooperative Extension Service, Carson City, Minden, Reno
  - Department of Anthropology
  - Department of Biology
  - Department of Geology
  - Desert Research Institute
  - Division of Agriculture and Resource Economics
  - Division of Plant, Soil and Water Science
  - Division of Renewable Natural Resources
  - Mackay School of Mines
  - Nevada Archaeological Survey
- Western Nevada Community College

LOCAL GOVERNMENTS/LIBRARIES

- City Officials for Reno, Sparks, Minden, Gardnerville, Carson City, Dayton, and Markleeville
- County Commissioners and Officials for Washoe, Storey, Lyon, Douglas, Carson City, Lassen, Alpine, Sierra and Plumas Counties
- Carson River Basin Council of Governments
- Washoe Council of Governments
- Alpine County Library
- Carson City Library

Douglas County Library
Lyon County Library
Nevada State Library
Washoe County Library
  Main Branch
  Sparks Branch
  Stead Branch

TRIBAL COUNCILS

Inter-tribal Council of Nevada
Pyramid Lake Paiute Tribal Council
Reno/Sparks Tribal Council
Washoe Tribal Council

ORGANIZATIONS

Amateur Archaeologists of Nevada
American Fisheries Society
American Horse Protection Association
American Humane Association
American Motorcycle Association
American Sportsmen's Club
Animal Protection Institute
Audubon Society, Lahontan Chapter
California Association of 4 Wheel Drive Clubs, Inc.
Canvasback Gun Club
Carson City Chamber of Commerce
Carson City Mineralogical Society
Carson River Conservation Fund
Carson Valley Chamber of Commerce
Desert Racing Association of Nevada
Desert Fishes Council
Friends of Nevada Wildlife
German Shorthair Pointer Club
Great Basin Zoological Society
High Plains Shifters
High Sierra Jeepers
Humane Society of the United States
Husqvarna Racing Team, Carson City
In the Tracks of Fremont
International Society for the Protection of Mustangs and Burros
League of Women Voters, Carson City
League of Women Voters, Reno
Lyon County Museum
National Animal Protection Association
National Mustang Association
National Resources Defense Council
Nevada Archaeological Association
Nevada Cattlemen's Association
Nevada Environmental Education Council
Nevada Farm Bureau Federation
Nevada Historical Society
Nevada Humane Society
Nevada League of Cities
Nevada Off-Road Vehicle Association
Nevada Open Land Organization Council
Nevada Organization for Wildlife
Nevada Outdoor Recreation Association
Nevada Sportsmen's Association
Nevada State Sheep Commission
Nevada Wilderness Association
Nevada Wildlife Federation
Nevada Woolgrowers Association
Northern Nevada Brittany Club
Northern Nevada Native Plant Society
Ormsby Sportsmen's Association
Over the Hill Gang
Public Lands Council
Red Rock Audubon Society
Reno Chamber of Commerce
Reno Gem and Mineral Society
Reno Jeepers
Reno 4 Wheelers
Reno Sno Drifters
Resource Concepts, Inc.
Save the Mustangs
Sierra Club, Toiyabe Chapter
Sierra Nevada Retriever Club
Silver State 4 Wheelers
Silver State Hunting Club
Sparks Community Chamber of Commerce
Storey County Sportsmen's Club
The Wilderness Society
The Wildlife Society, Nevada Chapter
Trout Unlimited
Valley Off-Road Racing Association
Virginia City Information Bureau
Washoe Council of Governments
Washoe Game Management Board
Western Regional Environmental Education Council
Wild Horse Organized Assistance
Livestock Grazing Permittees in the EIS area

APPENDICES

APPENDIX A

SOIL SURVEYS CONDUCTED IN THE RENO EIS AREA

APPENDIX A

SOIL SURVEYS CONDUCTED IN THE RENO EIS AREA

1. Unpublished, cooperative third order soil surveys conducted by BLM and SCS covering South and Central Washoe County, parts of Storey, Lyon and Douglas counties and parts of Alpine and Lassen Counties in California.
2. Published Soil Survey of the Sierra Valley Area, California, parts of Sierra, Plumas, and Lassen Counties conducted by U.S. Forest Service, 1975.
3. Published Soil Survey of Carson City, Nevada Area conducted jointly by U.S. Forest Service and SCS, 1979.
4. Published Soil Survey of Carson Valley Area, Nevada - California conducted by SCS, 1979.

APPENDIX B

SECTION 1 — WATER QUALITY SPECIFICATION

SECTION 2 — ESTIMATED ANNUAL CONSUMPTIVE USE FOR WATER RESOURCES

SECTION 3 — WATER QUALITY CRITERIA

SECTION 4 — WATER QUALITY SAMPLING SITES

SECTION 1

WATER QUALITY SPECIFICATIONS
RENO EIS AREA

ITEM	CLASS A WATERS	CLASS B WATERS	CLASS C WATERS
1. Floating solids, sludge deposits, tastes or odor producing substances.	None attributable to man's activities.		
2. Floating solids, settleable solids; sludge deposits.		Only such amounts attributable to man's activities which will not make the waters unsafe or unsuitable as a drinking water source, injurious to fish or wildlife, or impair the waters for any other beneficial use established for this class.	Only such amounts attributable to the activities of man which will not make the receiving waters injurious to fish or wildlife, or impair the waters for any beneficial use established for this class.
3. Sewage, industrial wastes or other wastes.	None.	None which are not effectively treated to the satisfaction of the Department.	None which are not effectively treated to the satisfaction of the Department.
4. Toxic materials; oils; deleterious substances; colored or other wastes.	None.		
5. Odor producing substances.		Only such amounts which will not impair the palatability of drinking water or fish, or have a deleterious effect upon fish, wildlife or any beneficial uses established for waters of this class.	

WATER QUALITY SPECIFICATIONS
RENO EIS AREA

ITEM	CLASS A WATERS	CLASS B WATERS	CLASS C WATERS
6. Toxic materials; oils; deleterious substances; colored or other wastes; or heated or cooled liquids.		Only such amounts as will not render the receiving waters injurious to fish or wildlife, or impair the receiving waters for any beneficial uses established for this class.	Only such amounts as will not render the receiving waters injurious to fish and wildlife, or impair the waters for any beneficial use established for this class.
7. Settleable solids.	Only amounts attributable to man's activities which will not make the waters unsafe or unsuitable as a drinking water source or which will not be detrimental to aquatic life or any other beneficial uses established for this class.		
8. pH.	Range between 6.5 to 8.5.	Range between 6.5 to 8.5.	Range between 6.5 to 8.5.
9. Dissolved oxygen.	Shall not be less than 6.0 milligrams/liter (mg/l).	For trout waters not less than 6.0 mg/l; for nontrout waters not less than 5.0 mg/l.	For trout waters not less than 6.0 mg/l; for nontrout waters not less than 5.0 mg/l.
10. Temperature.	Shall not exceed 20°C. Allowable temperature increase above natural receiving water temperature - none.	Shall not exceed 20°C for trout waters or 24°C for nontrout waters. Allowable temperature increase above natural receiving water temperatures - none.	Shall not exceed 20°C for trout waters or 34°C for nontrout waters. Allowable temperature increase above normal receiving water temperature - 3°C.

WATER QUALITY SPECIFICATIONS
RENO EIS AREA

ITEM	CLASS A WATERS	CLASS B WATERS	CLASS C WATERS
11. Fecal coliform.	The fecal coliform concentration, based on a minimum of 5 samples during any 30-day period, shall not exceed a geometric mean of 200 per 100 milliliters, nor shall more than 10% of total samples during any 30-day period exceed 400 per 100 milliliters.	The fecal coliform concentration, based on a minimum of 5 samples during any 30-day period, shall not exceed a geometric mean of 200 per 100 milliliters, nor shall more than 10% of total samples during any 30-day period exceed 400 per 100 milliters.	The more stringent of the following apply: The fecal coliform concentration shall not exceed a geometric mean of 1000 per 100 milliliters nor shall more than 20% of total samples exceed 2400 per 1000 milliliters. The annual geometric mean of fecal coliform concentration shall not exceed that characteristic of natural conditions by more than 200 per 100 milliliters nor shall the number of fecal coliform in a single sample exceed that characteristic of natural conditions by more than 400 per 100 milliliters. The fecal coliform concentration, based on a minimum of 5 samples during any 30-day period, shall not exceed a geometric mean of 200 per 100 milliliters, nor shall more than 10% of total samples during any 30-day period exceed 400 per 100 milliliters. This is applicable only to those waters used for primary contact recreation.

WATER QUALITY SPECIFICATIONS
RENO EIS AREA

ITEM	CLASS A WATERS	CLASS B WATERS	CLASS C WATERS
12. Total phosphate.	Total phosphate shall not exceed 0.15 mg/l in any stream at the point where it enters any reservoir or lake, nor 0.075 mg/l in any reservoir or lake, nor 0.30 mg/l in streams and other flowing waters.	Total phosphates shall not exceed 0.3 mg/l.	Total phosphates shall not exceed 1.0 mg/l.
13. Total dissolved solids.	Shall not exceed 500 mg/l or one-third above that characteristic of natural conditions (whichever is less).	Shall not exceed 500 mg/l or one-third above that characteristic of natural conditions (whichever is less).	Shall not exceed 500 mg/l or one-third above that characteristic of natural conditions (whichever is less).

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District Office, Unit Resource Analysis Step 2, 1980.

SECTION 2

ESTIMATED ANNUAL CONSUMPTIVE USE

Consumptive Use of Water Ac/ft/yr

Cattle	Sheep	Mule Deer	Wild Horses	Total
31.5	7.4	7.1	24.7	70.7

AUMs based on last three years average use.

Equation: $$\frac{\text{AUMs x av days/month (30.4) x gal/day/animal}}{3.259 \times 10^5 \text{ gal./Ac/ft.}} = \text{Ac/ft/yr}$$

Water consumption is based on the following rates:
Cattle 10 gallons/day/animal
Sheep 1.5 gallons/day/animal
Horses 10 gallons/day/animal
Deer 1 gallon/day/animal

For sheep and deer multiply AUM by 5.

Source: Water consumption data for livestock and horses from Stoddart et al, 1955, for Wildlife from U.S. Dept. of Interior, Bureau of Land Management, Carson City District.

The threshold for water consumption is exceeding 5 percent of the total annual runoff.

The thresholds for water quality are:

1) Turbidity - Ten nephelometer turbidity units (NTU's)
2) Temperature - Summer maximum of 23°C for fisheries
3) Fecal Coliform Bacteria - 1000/milliliter for agricultural use, wildlife propagation and livestock watering; 2000/milliliter for treatable drinking water, and 200/milliliter for bathing and water contact sports (less than 10 percent of the public surface waters are or have the potential for the latter beneficial uses).

These water quality thresholds are based on the "Nevada Water Pollution Control Regulations of 1979", and the water quality criteria for the pollution standards outlined in Article 4.14, Water Quality Criteria For Designated Beneficial Uses. Exceeding these thresholds would be a significant impact.

SECTION 3

WATER QUALITY CRITERIA FOR DESIGNATED BENEFICIAL USES

PARAMETER		AGRICULTURAL USE	AQUATIC LIFE		BATHING & WATER CONTACT SPORTS	BOATING & AESTHETICS	DRINKING WATER SUPPLY	INDUSTRIAL WATER SUPPLY	WILDLIFE PROPAGATION
			COLD WATER	WARM WATER					
Temperature C Summer maximum	<		23^a	30^a	$15-34^a$	$15-34^a$			
Winter Maximum	<		14^a	14^a					
pH Units Single Value		$4.5-9.0^b$	$6.5-9.0^b$	$6.5-9.0^b$	$6.5-8.3^a$		$5.0-9.0^b$	$3.0-11.7^b$	$7.0-9.2^a$
Dissolved Oxygen Single Value-mg/l	>	Aerobic^b	5.0^b	5.0^b	Aerobic^b	Aerobic^b	Aerobic^b		Aerobic^b
Chlorides Single Value-mg/l	<						250^c		
Phosphates as P Single Value-mg/l	<		TO BE DETERMINED BY BIOASSAY						
Nitrates as N Single Value-mg/l	<	100^a		90^b			10^b		100^a
Nitrates as N Single Value-mg/l	<	10^a	0.05^f	0.05^f			1.0^a		10^a
Un-ionized Ammonia Single Value-mg/l	<		0.02^b	0.10^f			0.5^f		
Total Dissolved Solids Single Value-mg/l	<	1000^b					500^c		
Color (PT-CO), Single Value	<						75^b		
Turbidity, Single Value-NTU	<		10^d	50^d			250^e		
Fecal Coliform (MF/100ml) Annual Geometric Mean	<	1000^a			200^f	1000^f	2000^a		1000^a
Alkalinity Single Value-mg/l	>		20^b	20^b					$30-130^a$
Suspended Solids Single Value-mg/l	<		80^a	80^a					
Sulfate Single Value-mg/l	<						250^b		
Aldrin Single Value-mg/l	<	0.001^a	0.000003^b	0.000003^b			0.001^a		0.001^a

Aldrin & Dieldrin Single Value-mg/l	<	0.001^a	0.000003^b	0.000003^b			0.001^a		0.001^a
Chlordane Single Value-mg/l	<	0.003^a	0.00001^b	0.00001^b			0.003^a		0.003^a
DDT Single Value-mg/l	<	0.05^a	0.000001^b	0.000001^b			0.05^a		0.05^a
Demeton Single Value-mg/l	<	Detectable Limit	0.0001^b	0.0001^b			Detectable Limit		Detectable Limit
Dieldrin Single Value-mg/l	<	0.0001^a	0.000003^b	0.000003^b			0.001^a		0.001^a
Endosulfan Single Value-mg/l	<	Detectable Limit	0.000003^b	0.000003^b			Detectable Limit		Detectable Limit
Endrin Single Value-mg/l	<	0.0002^b	0.000004^b	0.000004^b			0.0002^b		0.0002^b
Guthion Single Value-mg/l	<	Detectable Limit	0.00001^b	0.00001^b			Detectable Limit		Detectable Limit
Heptachlor Single Value-mg/l	<	0.001^a	0.000001^b	0.000001^b			0.0001^a		0.0001^a
Lindane Single Value-mg/l	<	0.004^b	0.00001^b	0.00001^b			0.004^b		0.004^b
Malathion Single Value-mg/l	<	Detectable Limit	0.0001^b	0.0001^b			Detectable Limit		Detectable Limit
Methoxychlor Single Value-mg/l	<	0.1^b	0.00003^b	0.00003^b			0.1^b		0.1^b
Mirex Single Value-mg/l	<	Detectable Limit	0.000001^b	0.000001^b			Detectable Limit		Detectable Limit
Parathion Single Value-mg/l	<	Detectable Limit	0.00004^b	0.00004^b			Detectable Limit		Detectable Limit
2,4 - D Single Value-mg/l	<	0.1^b					0.1^b		0.1^b
Silvex Single Value-mg/l	<	0.01^b					0.01^b		0.01^b
Toxaphene Single Value-mg/l	<	0.005^b	0.000005^b	0.000005^b			0.005^b		0.005^b

REFERENCES & FOOTNOTES

a. National Academy of Sciences, Water Quality Criteria (Blue Book), 1972.

b. U.S. Environmental Protection Agency, 1976, Quality Criteria for Water (Red Book). EPA - 440/9-76-023. Office of Water and Hazardous Materials. Washington, D.C.

c. Nevada Division of Health. 1977. Water Supply Regulation, Part I. Water Quality Standards, Monitoring, Record Keeping and Reporting. State Board of Health, Carson City, Nevada.

d. Report of the Commission on Water Quality Criteria (FWCPA) - Green Book, 1968.

e. Water Treatment Plant Design (ASCE and AWWA) 1970.

f. State of Colorado 1978. Colorado Water Quality Control Commission Water Quality Standards, Adopted May 2, 1978; Effective July 20, 1978. Boulder, Colorado.

< means less than

> means greater than

(1) Fluoride limits vary from 1.4 mg/l to 2.4 mg/l based on the annual average of the maximum daily air temperature (see Reference c).

Approved and adopted by the Nevada State Environmental Commission on August 12,1980.

WATER QUALITY CRITERIA FOR DESIGNATED BENEFICIAL USES

PARAMETER		AGRICULTURE	WATER HARDNESS RELATIVE TO AQUATIC LIFE (COLD OR WARM WATER)					BATHING AND WATER CONTACT SPORTS	BOATING AND AESTHETICS	DRINKING WATER SUPPLY	INDUSTRIAL WATER SUPPLY	WILDLIFE PROPAGATION
			0-100	100-200	200-300	300-400	400+					
Arsenic Single Value - mg/l	<	0.1^{b}	0.05^{f}	0.05^{f}	0.05^{f}	0.05^{f}	0.05^{f}			0.05^{b}		
Barium Single Value - mg/l	<		5.0^{f}	5.0^{f}	5.0^{f}	5.0^{f}	5.0^{f}			1.0^{b}		
Beryllium Single Value - mg/l	<	0.1^{b}	0.01^{f}	0.3^{f}	0.6^{f}	0.9^{f}	1.1^{f}					
Cadmium Single Value - mg/l	<	0.01^{a}	0.0004^{f}	0.001^{f}	0.005^{f}	0.010^{f}	0.015^{f}			0.01^{b}		0.05^{a}
Chromium Single Value - mg/l	<	0.1^{a}	0.1^{b}	0.1^{b}	0.1^{b}	0.1^{b}	0.1^{b}			0.05^{b}		1.0^{a}
Cobalt Single Value - mg/l	<	0.05^{a}										1.0^{a}
Copper Single Value - mg/l	<	0.2^{a}	0.01^{f}	0.01^{f}	0.01^{f}	0.02^{f}	0.04^{f}			1.0^{b}		0.5^{b}
Cyanide Single Value - mg/l	<		0.005^{b}	0.005^{b}	0.005^{b}	0.005^{b}	0.005^{b}			0.2^{a}		0.005^{b}
Fluoride Single Value - mg/l	<	1.0^{a}								c(1)		2.0^{a}
Iron Single Value - mg/l	<	5.0^{a}	1.0^{b}	1.0^{b}	1.0^{b}	1.0^{b}	1.0^{b}			0.3^{b}		
Lead Single Value - mg/l	<	0.1^{a}	0.004^{f}	0.025^{f}	0.05^{f}	0.10^{f}	0.15^{f}			0.05^{b}		0.1^{a}

Manganese Single Value - mg/l	<	0.2[b]	1.0[f]	1.0[f]	1.0[f]	1.0[f]	1.0[f]			0.05[b]		
Mercury Single Value - mg/l	<	0.00005[b]	0.00005[b]	0.00005[b]	0.00005[b]	0.00005[b]	0.00005[b]			0.002[b]		0.00005[b]
Nickel Single Value - mg/l	<	0.1[b]	0.05[f]	0.10[f]	0.20[f]	0.30[f]	0.40[f]					
Phenolics Single Value - mg/l	<		0.001[b]	0.001[b]	0.001[b]	0.001[b]	0.001[b]			0.001[b]		
Phthalate Esters Single Value - mg/l	<		0.003[b]	0.003[b]	0.003[b]	0.003[b]	0.003[b]					
Polychlorinated Biphenyls Single Value - mg/l	<		0.000001[b]	0.000001[b]	0.000001[b]	0.000001[b]	0.000001[b]					
Selenium Single Value - mg/l	<	0.02[a]	0.05[f]	0.05[f]	0.05[f]	0.05[f]	0.05[f]			0.01[b]		0.05[a]
Silver Single Value - mg/l	<		0.00010[f]	0.00010[f]	0.00015[f]	0.00020[f]	0.00025[f]			0.05[b]		
Sulfide-Undissociated Single Value - mg/l	<		0.002[b]	0.002[b]	0.002[b]	0.002[b]	0.002[f]			0.05[b]		
Zinc Single Value - mg/l	<	2.0[a]	0.05[f]	0.05[f]	0.10[f]	0.30[f]	0.60[f]			5.0[b]		25.0[a]

REFERENCES AND FOOTNOTES

a. National Academy of Sciences, Water Quality Criteria (Blue Book), 1972.

b. U.S.Environmental Protection Agency, 1976, Quality Criteria for Water (Red Book). EPA - 440/9-76-023. Office of Water and Hazardous Materials, Washington, D.C.

c. Nevada Division of Health, 1977. Water Supply Regulation, Part I. Water Quality Standards, Monitoring, Record Keeping and Reporting. State Board of Health, Carson City, Nevada.

d. Report of the Commission on Water Quality Criteria (FWCPA) - Green Book, 1968.

e. Water Treatment Plant Design (ASCE and AWWA) 1970.

f. State of Colorado 1978. Colorado Water Quality Control Commission Water Quality Standards, Adopted May 2, 1978; Effective July 20, 1978. Boulder, Colorado.

SECTION 4

WATER QUALITY SAMPLING SITES
RENO EIS AREA

1.	Frandsen Spring	T. 22 N., R. 18 E., Sec. 6 NW1/4SE1/4 (Chilcoot Quad)
2.	Mud Spring	T. 22 N., R. 18 E., Sec. 21 NW1/4NE1/4 (Dogskin Quad)
3.	Horse Spring	T. 22 N., R. 18 E., Sec. 16 NW1/4SE1/4 (Dogskin Quad)
4.	Hillside Spring	T. 22 N., R. 18 E., Sec. 15 NE1/4NW1/4 (Dogskin Quad)
5.	Lake Spring	T. 22 N., R. 18 E., Sec. 15 SE1/4SW1/4 (Dogskin Quad)
6.	Willow Spring # 2	T. 25 N., R. 18 E., Sec. 34 NE1/4NW1/4 (Dogskin Quad)
7.	Higgens Spring	T. 24 N., R. 19 E., Sec. 18 NW1/4SE1/4 (Dogskin Quad)
8.	Bedell Spring	T. 23 N., R. 19 E., Sec. 4 N1/2N1/2NE1/4 (Dogskin Quad)
9.	Settlemeyer Spring	T. 24 N., R. 19 E., Sec. 35 (unsurveyed) (Dogskin Quad)
10.	Bird Spring	T. 22 N., R. 19 E., Sec. 6 W1/2SW1/4 (Dogskin Quad)
11.	Juniper Spring	T. 22 N., R. 19 E., Sec. 6 E1/2SW1/4 (Dogskin Quad)
12.	Double Spring	T. 23 N., R. 21 E., Sec. 6 SE1/4SW1/4 (Sutcliffe Quad)
13.	Desert Well	T. 26 N., R. 18 E., Sec. 26 NW1/4NE1/4 (State Line Peak)
14.	Bull Spring	T. 25 N., R. 18 E., Sec. 23 NE1/4NW1/4 (State Line Peak)
15.	Juniper Basin Spring	T. 26 N., R. 19 E., Sec. 12 NE1/4NE1/4 (unsurveyed) (Astor Pass)
16.	Upper Adobe Spring	T. 26 N., R. 20 E., Sec. 7 NW1/4SE1/4 (Astor Pass Quad)

WATER QUALITY SAMPLING SITES

17.	Lower Adobe Spring	T. 26 N., R. 20 E., Sec. 7 SE1/4SE1/4 (Astor Pass Quad)
18.	Penny Artesian	T. 24 N., R. 17 E., Sec. 24 NE1/4 (Chilcoot)
19.	Shallow Spring	T. 26 N., R. 20 E., Sec. 16 NE1/4 (The Needle Rocks Quad)
20.	Peterson Spring	T. 22 N., R. 18 E., Sec. 10 W1/2 (Dogskin Quad)
21.	Jumbo Creek	T. 16 N., R. 20 E., Sec. 4 SE1/4NE1/4 (Virginia City 7.5' Quad)
22.	Galena Creek	T. 17 N., R. 19 E., Sec. 12 SE1/4SE1/4 (Washoe City Quad)
23.	Red Rock Creek	T. 24 N., R. 18 E., Sec. 31 NE1/4 (Chilcoot and Dogskin Quads)
24.	Red Rock Spring #1	T. 24 N., R. 19 E., Sec. 29 NW1/4 (Dogskin Quad)
25.	Red Rock Spring #2	T. 24 N., R. 19 E., Sec. 28 SW1/4 (Dogskin Quad)
26.	Red Rock Spring #4	T. 24 N., R. 19 E., Sec. 28 SW1/4 (Dogskin Quad)
27.	Red Rock Spring #5	T. 24 N., R. 19 E., Sec. 28 NE1/4 (Dogskin Quad)
28.	Red Rock Spring #6	T. 24 N., R. 19 E., Sec. 28 NE1/4 (Dogskin Quad)
29.	Lower Loam Spring	T. 24 N., R. 19 E., Sec. 28 NE1/4 (Dogskin Quad)
30.	McKissick Spring	T. 24 N., R. 19 E., Sec. 22 SE1/4 (Dogskin Quad)
31.	Badger Spring	T. 15 N., R. 21 E., Sec. 29 SW1/4NE1/4 (Dayton Quad)
32.	Bull Run Spring	T. 15 N., R. 21 E., Sec. 23 NE1/4NE1/4 (Dayton Quad)

WATER QUALITY SAMPLING SITES

33.	Hackett Canyon Spring	T. 16 N., R. 21 E., Sec. 35 NW1/4SE1/4 (Dayton Quad)
34.	Nettle Spring	T. 16 N., R. 22 E., Sec. 29 SE1/4SE1/4 (unsurveyed) (Dayton Quad)
35.	Spring	T. 14 N., R. 22 E., Sec. 9 SW1/4SW1/4 (Dayton Quad)
36.	Mill Canyon Spring #2	T. 11 N., R. 22 E., Sec. 8 NE1/4NE1/4 (Mt. Siegel Quad)
37.	Rawe Peak North Spring	T. 16 N., R. 22 E., Sec. 24 SE1/4SW1/4 (Como Quad)
38.	Slater's Mine Spr. #1	T. 12 N., R. 22 E., Sec. 15 NE1/4NE1/4 (Wellington Quad)
39.	Pine Nut Creek	T. 12 N., R. 21 E., Sec. 24 NE1/4SW1/4 (Mt. Siegel Quad)
40.	Mill Canyon Spring #1	T. 11 N., R. 22 E., Sec. 9 NW1/4NW1/4 (Mt. Siegel Quad)
41.	Spring	T. 17 N., R. 22 E., Sec. 10 SE1/4SE1/4 (Churchill Butte Quad)
42.	Spring	T. 16 N., R. 23 E., Sec. 8 SE1/4NE1/4 (unsurveyed) (Churchill Butte Quad)
43.	Spring	T. 16 N., R. 22 E., Sec. 14 SW1/4SE1/4 (Como Quad)
44.	Como Spring #1	T. 15 N., R. 23 E., Sec. 7 NW1/4NW1/4 (Como Quad)
45.	Como Spring #2	T. 15 N., R. 23 E., Sec. 7 NW1/4SW1/4 (Como Quad)
46.	Quail Spring	T. 14 N., R. 22 E., Sec. 12 SW1/4NW1/4 (Como Quad)
47.	Powerline Spring	T. 14 N., R. 22 E., Sec. 13 NE1/4NE1/4 (Como Quad)
48.	Sunrise Camp Spr. West	T. 14 N., R. 22 E., Sec. 13 NW1/4SE1/4SE1/4 (Como Quad)

WATER QUALITY SAMPLING SITES

49.	Sunrise Camp Spr. East	T. 14 N., R. 22 E., Sec. 13 E1/2SE1/4SE1/4 (Como Quad)
50.	Twin Spring	T. 14 N., R. 23 E., Sec. 31 SE1/4NW1/4 (Como Quad)
51.	Willow Spring	T. 12 N., R. 23 E., Sec. 14 SE1/4SW1/4 (Como Quad)
52.	Slater's Mine Spr. #2	T. 12 N., R. 22 E., Sec. 14 NW1/4NW1/4 (Wellington Quad)
53.	Winters Mine Spring[1]	T. 12 N., R. 22 E., Sec. 26 SW1/4NW1/4 (Wellington Quad)
54.	Winters Mine Spring[1]	T. 12 N., R. 22 E., Sec. 26 SW1/4NW1/4 (Wellington Quad)
55.	Lookout Spring	T. 16 N., R. 20 E., Sec. 14 SW1/4NE1/4 (Virginia City 7.5' Quad)
56.	Rock Island Mine Spring #1	T. 16 N., R. 20 E., Sec. 12 NW1/4NE1/4NE1/4 (Virginia City 7.5' Quad)
57.	Spring	T. 17 N., R. 21 E., Sec. 24 NW1/4NE1/4 (Flowery Peak 7.5' Quad)
58.	Rock Island Mine Spring #2	T. 16 N., R. 20 E., Sec. 12 SW1/4NE1/4NE1/4 (Virginia City 7.5' Quad)
59.	Hercules Mine Spring	T. 16 N., R. 22 E., Sec. 24 SE1/4 (unsurveyed) (Como Quad)
60.	Spring	T. 17 N., R. 21 E., Sec. 26 NW1/4NW1/4 (Flowery Peak 7.5' Quad)

[1] Sampled inside and outside the exclosure, as separate springs.

Source: U.S. Department of the Interior, Bureau of Land Management, Unit Resource Analysis, Step 3, 1980.

APPENDIX C

SECTION 1 — METHODOLOGY FOR THE PREPARATION OF SUPPORT TABLES

SECTION 2 — WOODLAND ACREAGE TABULATION

APPENDIX C, SECTION 1

METHODOLOGY FOR THE PREPARATION OF SUPPORT TABLES

Table 2-4, Vegetation Condition and Trend Summary By Allotment

This table includes a summary of vegetation condition and trend data by individual allotment. Data sources and method of preparation are as follows:

1) The ecological condition, forage condition, unsuitable acres and total acres data was summarized from the 1978-1980 SVIM data compiled by individual allotment on the 'Vegetation Inventory Write-up Summary by Allotment' form (available for review at the Carson City District Office). Refer to Appendix D, Section 2 for a brief description of the SVIM process and to Appendix D, Section 1 for an explanation of determining condition.
2) The trend data was summarized from individual allotment records. Data was collected using the Photo-Plot Measurement Method as described in BLM Manual section 4430.

Table 2-3, Ecological Range and Forage Condition by Range Site

This table includes a summary of vegetation condition information by individual range site encountered during the 1978-1980 SVIM vegetation inventory. As in Table 2-3, all data was summarized from the 1978-1980 SVIM data compiled on the 'Vegetative Inventory Write-up Summary by Allotment' form. During the inventory all mapping detail was recorded on stable (no shrinkage due to air humidity) mylar and all acres within each allotment were measured with an electronic digital planimeter. See explanation below detailing the interpretation of range site names.

Appendix E, Section 2, Table 2-1, Range Sites and Acreage Tabulation by Site

This table includes a brief description of each range site encountered during the vegetation inventory in the Reno EIS area and a summary of acres by range site. The acreage values have the same source and were summarized in the same fashion as those included in Table 2-3. The brief range site descriptions were summarized from complete range site descriptions prepared by the Soil Conservation Service (available for review at the Carson City District Office).

The interpretation of the table follows:

1) Range Site Number

26-05

Major Land Resource Area designation number	range site identification number in MLRA 26

Range Site Name

Loamy 12-14" pz

range site name	precipitation zone

2) Potential - low, moderate, or high; see Appendix E, Section 2 for a description of the characteristics defining each potential category.
3) The acreage and percent of area of the range sites were summarized from the 1978-1980 vegetation inventory and depict the importance (by occurrence) of the various range sites in the EIS area.
4) Production, percent cover, and percent grasses, forbs and shrubs are vegetation values associated with the climax plant community. Production ranges and percent of grasses, forbs, shrubs (relative abundance of the various life forms) are based on peak annual biomass production of vegetation corrected to dry weight.
5) Elevation, soil characteristics, and land forms are general site characteristics associated with each range site where it normally occurs.
6) Associated species is a list of dominant plant species which define the climax plant community.

SECTION 2

Appendix C, Section 2, Table 2-1, Woodland Acreage Tabulation

This table includes a summary of the number of acres of woodland, and type of woodland, associated with each site. This was necessary since the occurrence of woodland may significantly affect a site's ability to improve in vegetation condition. Percent of Range Site is a listing of the percent of each range site currently dominated by woodland. This information was gathered in the following fashion:

The VB forms (acreage stratification form; see Appendix D, Section 2 describing the stratification process) and the actual field forms (#NV-4412-2 'SVIM Condition Class Write-up form) from the vegetation inventory within the Reno EIS area were inspected by allotment to determine the occurrence of woodland. The acreages for those Site Write-up Areas supporting woodland were totaled and summarized from the "Vegetation Inventory Write-up Summary by Allotment" form. All information was summarized from the 1978-1980 SVIM inventory.

APPENDIX C, SECTION 2, TABLE 2-1
WOODLAND ACREAGE TABULATION

RANGE SITE NAME	RANGE SITE NUMBER	SINGLE LEAF PINYON PINE (PIMO)	UTAH OR WESTERN JUNIPER (JUOS, JUOC)	SINGLE LEAF PINYON & JUNIPER	JEFFREY PINE (PIJE)	WHITE FIR (ABCO)	PONDEROSA PINE (PIPO)	TOTAL ACRES OF WOODLAND	PERCENT OF RANGE SITE[b]
Grazable P/J Woodland 16-24" pz	22-994	2,544			201			2,745	74
Grazable Jeffrey Pine Woodland 16-24" pz	22-997				164			164	100
Jeffrey Pine Woodland	22-998				2,404		153	2,557	100
White Fir Woodland	22-999					333		333	100
Loamy 10-12" pz	23-20		2,669					2,669	13
Claypan 10-12" pz	23-998		287					287	29
Eroded South Slope 8-10" pz	23-999		459					459	32
Loamy 12-14" pz	26-05	11,074	1,061	18,838				30,973	60
Granitic Uplands 10-12" pz	26-06		112					112	2
Steep North Slopes 14-20" pz	26-07		121					121	4
Granitic Fan 10-12" pz	26-08		404					404	33
Loamy 10-12" pz	26-10	14,833	1,320	14,309	492			30,954	45
South Slope 8-12" pz	26-11		155	97				252	49
Dunes 10-12" pz	26-14		71					71	1
Shallow Loam 10-12" pz	26-15	10,413	1,209	18,555	873			31,050	57
Loamy 8-10" pz	26-16			128				128	<1
Juniper Savannah 10-12" pz	26-17		20,915					20,915	41
Shallow Granitic Upland 10-12" pz	26-18	789	725		78			1,592	4
Sandy 8-10" pz	26-20		135	116				251	1
Shallow Stony Loam 8-10" pz	26-22		410	485				895	5
Claypan 10-12" pz	26-23	3,200	2,072	4,966	24			10,262	27
Claypan 8-10" pz	26-25		2,244	3,345				5,589	7
Granitic Upland 10-12" pz	26-26		57					57	49
Mountain Ridges 12-16" pz	26-28		17					17	<1
Eroded Slopes 8-12" pz	26-29	306	185	2,446				2,937	19
Upland Browse 12-16" pz	26-40			90				90	81
Shallow Loam 8-10" pz	27-998		643					643	13
		43,159	35,271	63,375	4,236	333	153	146,527	

a/ Percent of range sites having woodland canopy of greater than or equal to 10 percent.

b/ See Table 2-1, Range Sites and Acreage Tabulation by Site, Appendix E, Section 2.

Note: Public land only for those allotments surveyed between 1978 and 1980.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District Office, SVIM Inventory, 1980.

APPENDIX D

SECTION 1 — METHODOLOGY FOR DETERMINING ECOLOGICAL CONDITION CLASS

SECTION 2 — SOIL VEGETATION METHOD (SVIM)

APPENDIX D, SECTION 1

METHODOLOGY FOR DETERMINING ECOLOGICAL CONDITION CLASS

The ecological condition of areas within a range site was determined by comparing the present plant community with the climax plant community, as indicated by the rangeland condition guides for the site.

Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax community (SCS 1976). The four classes are:

Rangeland Condition Class	Percentage of present plant community that is climax for the range site
Excellent (climax)	76-100
Good (late seral)	51-75
Fair (mid seral)	26-50
Poor (early seral)	0-25

Percent composition of each species of the existing plant community cannot exceed the percent composition of the same species which count as climax, as shown on the guide for the climax plant community. The amount of all climax species not in excess of that shown on the rating will be between 0 and 100. An example of the calculations for a loamy range site occuring in the Major Land Resource Area 26 is shown below.

PLANT	MAXIMUM PERCENT COMPOSITION	PRESENT PERCENT COMPOSITION	ADJUSTED PERCENT COMPOSITION
Thurber needlegrass	15-25	5	5
Sandberg bluegrass	5-10	3	3
Bottlebrush squirreltail	2-5	5	5
Arrowleaf balsamroot	1-3	10	3
Native annual forbs	1-5	2	2
Wyoming big sagebrush	10-20	50	20
Antelope bitterbrush	5-10	10	10
Douglas rabbitbrush	1-3	10	3
Desert peach	1-3	5	3
		100 percent	54

Maximum annual production 600 pounds to 900 pounds per acre. Present production equals 400 pounds per acre.

Guides based on the weight of species in the climax plant community give a true expression of ecological condition. A condition rating based on the percentage of composition alone may need adjustment if the total production is less than that characteristic for the condition class. In this example, the rating determined by counting the percentage of each climax species indicates the existing plant community is in good condition, but the production of these species is significantly less than that expected for the good condition class. The condition rating should be lowered to fair as a result of the low production. This action may be taken while giving due consideration to the current growing conditions.

A complete Loamy 10-12‘ precipitation zone, D26-10 range site guide is available for review at the Carson City District Office.

APPENDIX D, SECTION 2

METHODOLOGY

SOIL-VEGETATION INVENTORY METHOD (SVIM)

Instructions for completing the vegetation inventory in the Reno EIS Area are described in BLM Manual 4412.14.

This procedure can be described in four distinct phases: vegetation typing or mapping, transecting, compilation and computation.

Typing or mapping was done by soil-vegetation units on aerial photos. Vegetation was typed according to site potential and dominant species aspect. These units were then further divided to delineate areas with similar plant species composition, cover, density and production. A field form titled SVIM Condition Class Write-up was used to summarize this data for each map unit. A preliminary range or ecological condition rating was determined by comparing the present vegetation to the appropriate range site description or climax community (Appendix D, Section 1), and if needed, the mapping unit was again divided into units of similar condition. The final mapping unit was an area of similar vegetation in a similar rangeland condition occurring on the same range site and related soils. These units were then considered to be Site-Write-up Areas (SWAs). Similar SWAs (similar range sites, condition, production, species composition, etc.) were stratified (grouped) together by allotment to simplify sampling and later computation.

Sampling of SWAs was done by transects traversing the soil-vegetative unit in a manner which obtained a representative sample of the SWA. Information on vegetation production was obtained at 20 evenly spaced plots across the SWA along the transect line. At times, a SWA contained more than one vegetative unit because the soils occurred in a complex mosaic pattern impossible to separate in mapping. When dissimilar range sites were thus included in one SWA, the vegetative production, composition, cover and range condition were recorded for each one. The relative percentage of each range site in the SWA was recorded; each range site was then sampled with a similar percentage of the SWA's total transect plots.

Weight estimate plots of 9.6 square feet were used. At least two of the 20 plots were clipped and weighed to maintain accuracy in estimates. Green weight in grams for each plant species occurring in the plot was recorded. Data on average availability, phenology and utilization were obtained for each plant species within the weight estimate plot.

Data required to develop factors to adjust vegetation production recorded at the time of inventory to maximum production for the season were gathered at intervals throughout the growing season in the inventory area. All major plant species were clipped and weighed and the dimensions of the plants were recorded for all phenology stages.

Precipitation data were gathered from official weather stations to develop a factor for adjusting vegetation production to a long-term average of growing season rainfall.

Compilation of acres by land status for each SWA and allotment totals were completed after the field inventory was finished. Adjustment factors used to convert green weights to dry weights were determined from samples collected during the inventory, air dried and percentages of dry weight to green weight calculated.

Many of the mathematical computations were done by computer in the BLM's Denver Service Center using a computer program prepared by the BLM Nevada State Office (NSO). This program had some limitations and could process production data only. Vegetation characterization (i.e., 1/100 acre shrub and tree characterization plots in which form and age class for five shrubs and trees of each species, average height and crown diameter by species and total number of plants by species are recorded; two 9.6 square foot plots in which form and age class for each plant of grasses and forbs and average height by grass and forb species with totals for each category are recorded) and the 200 pace transect steps (in which basal hits on live vegetation (by species), litter, gravel, cobbles or stones, bare ground or bedrock are recorded) were omitted from field data collection in the last year of the vegetation inventory because the NSO program was not designed to process it. Shrub leader length data was never collected. These were the only significant modifications made to the basic SVIM manual methodology.

As for production data processing, the first calculation converted green weight in grams to dry weight in pounds. Availability of 100 percent was assumed for livestock and wildlife. A phenological adjustment factor was used to convert all field data to maximum production for the entire growing season. A precipitation adjustment factor was used to adjust all production figures to be in accordance with any departures from the long-term average growing season rainfall. Before the field data was entered in the program the recorded percent utilization was reviewed and the production data normalized to zero percent utilization. Thus, any grazing use was compensated for. Finally, proper use adjustment factors for each class of livestock, period-of-use and species of wildlife (deer in this case) were applied to the production computed for each plant species. The result was a carrying capacity figure, in acres per animal unit month (AUM), for each strata of similar SWAs.

The carrying capacity for each allotment was determined by manually dividing each SWA's recorded acres by the appropriate acre per AUM figure (the acre per AUM figure selected depended on the period-of-use and class of livestock in the allotment, whether competition with deer exists and the stratum to which the SWA was assigned). The resulting AUMs listed for each SWA were then totalled to determine the allotment carrying capacity.

An analysis of the final calculated data indicates some inconsistency in pounds of vegetation produciton between areas of similar type vegetation with similar species composition and cover.

This inconsistency is attributed to plot size, the number of plots sampled and transect location. Insufficient number of samples or size of area sampled would tend to overestimate the production as often as it would underestimate the production.

Because of the indicated inconsistencies, forage production data derived from the survey was not used for determining grazing capacity on individual allotments. Range site potential information derived from the survey was, however, used as a basis for describing the existing environment and assessing the impacts of the Proposed Action and various alternatives. The product described is available for review at the Carson City District Office.

APPENDIX E

SECTION 1 — BACKGROUND INFORMATION

SECTION 2 — RANGE SITE POTENTIALS

APPENDIX E, SECTION 1

Background Information Critical in the Development of Estimates for the Degree and Rate of Improvement in Vegetation Condition for the Proposed Action, Resource Protection and Maximization of Livestock Grazing Alternatives

Use of the utilization study results currently available to modify stocking rates probably will not realize the goal of good (late seral), or better, ecological condition. Current utilization study method results, when used as a stocking guide, manage for the current vegetation condition, or perhaps for a slight improvement in condition. An example would best explain this situation; consider a loamy 10-12' pz range site which in climax condition would have 30 to 55 percent perennial grasses, including Thurber needlegrass, basin wildrye, Sandberg bluegrass and bottlebrush squirreltail. Sandberg bluegrass is a minor component of the climax community (equal to or less than five percent of the composition) and in a situation where the ecological condition is good or excellent, Sandberg bluegrass may have a proper use factor (PUF) of only 30 to 35 percent utilization (in this particular range site with this particular grass species composition). The utilization study method currently used requires the selection of a key plant species which is examined on transects throughout an allotment for the degree of utilization it is receiving. A PUF of 50 percent is commonly used. If Sandberg bluegrass were the only grass species present (the most desirable species remaining) then it may be selected as the key species and a PUF value of 50 percent used as a measure of proper utilization. This approach would hold true for any of the other less desirable grass species (subordinate species in the climax plant community e.g., bottlebrush squirreltail) which would have a PUF of less than 50 percent in the climax plant community. This utilization method, in the past, has not been correlated with the occurrence of range sites in the field. One key species (eg., Sandberg bluegrass or bottlebrush squirreltail) may be used across several ranges sites simply because they all have the same current vegetation aspect. Then, by using a PUF value of 50 percent across the board for all grass species when determining proper utilization, and later, adjusting the stocking rates based on the utilization studies, the management for improving ecological condition is less than optimal. The rate and degree of improvement in ecological condition would be slow and minimal, respectively.

In the future, it is expected that these weaknesses in the utilization studies will be overcome by examining utilization in key areas where the range sites and their potentials are known, and PUF values could be selected which more closely approximate the utilization the selected key species would receive in the climax plant association. When this will occur is undetermined at this time since it depends upon many factors including the availability of information and the rate at which the Coordinated Resource Management Planning (CRMP) program can become operational. It is assumed that these modifications will occur, however. The management of grazing systems, use distribution, stocking rates, etc., would be based on these study results. Correlating utilization studies to range sites and using more accurate PUFs for the key species selected would speed the improvement of ecological condition, forage condition and trend to the management goal decided upon by land managers during the CRMP process.

Presently, only the current utilization study results are available for adjusting livestock use over a five year management period. Utilization and monitoring studies using methods more closely tied to the ecological potential of the range may be developed and implemented during this time of adjustment. Further management actions may come at a later date based upon these results.

SECTION 2

RANGE SITE POTENTIALS

A review of Table 2-1 in this appendix reveals similarities in range sites based on vegetation production and cover, elevation, soil characteristics, land forms and associated vegetative species. For the purpose of discussion, some general statements can be made concerning those range sites having the following:

1) moderately deep to deep loamy or sandy soils; these soils and their related sites generally...
   - occur in upland locations on mountain sideslopes or alluvial fans
   - have few vegetative growth restricting factors
   - have high production, high potential for treatments or recovery after degradation, and high stability (i.e., less easily damaged by overgrazing)
   - depending on elevation and aspect, may support Wyoming big sagebrush and Thurber needlegrass, or mountain big sagebrush and Idaho fescue

2) shallow and/or stony soils; these soils and their related sites generally ...
   - occur on steeper hills, mountain sideslopes, or ridges
   - have low to moderate available moisture
   - have vegetative growth restrictions caused by shallow rooting depth and/or stoniness
   - have low to moderate production, low potential for rapid recovery after degradation or for treatments, and lower stability (i.e., more easily damaged by overgrazing)
   - may have Wyoming big sagebrush, Thurber needlegrass or desert needlegrass dominant on sideslopes, while on mountain ridges, low sagebrush and bluegrass species are dominant

3) clayey soils or soils with a higher accumulation of clay in the profile; these soils and related sites generally ...
   - occur on mountain sideslopes or terraces
   - have higher available moisture because of the clay in the profile (the clay accumulation, however, may restrict root penetration)
   - have low potential for treatments, or rapid recovery after degradation, low production potential and lower stability (more easily damaged by overgrazing)
   - have low sagebrush, Thurber needlegrass and bluegrass species dominant

4) deep well-drained soils; these soils and related sites generally...
   - occur in mountain valley basins
   - have high available moisture
   - have few vegetative growth restricting factors
   - have high production potential, high potential for treatments or recovery from degradation and higher stability
   - may have basin big sagebrush, basin wildrye, creeping wildrye, bluegrass species, willow and rose species dominant

5) salty and/or alkaline soils; these soils and their related sites generally ...
   - occur at lower elevations along river courses and on old relict terraces, or in upland positions on hillside terraces and sideslopes
   - the upland soils have low available moisture while the reverse is true in the lowland soils
   - both types of soils have soil salts and/or alkalinity that hinder vegetative growth
   - the lowland soils have high production potential while the reverse is true of the upland soils
   - both soils have low potential for recovery after degradation, less stablility and low potential for treatment

With these generalizations in mind, the range sites can be grouped as low potential, moderate potential or high potential sites. Defining characteristics for each of these categories are as follows:

1) low potential sites:
   a) harsh growing conditions i.e., shallow soil, alkaline soil, churning clay soil, etc.;
   b) range seedings are impossible because of rugged topography and/or will not succeed due to growing conditions;
   c) reduced understory production due to site domination by conifers or mountain mahogany;
   d) annual precipitation generally ranges from four to ten inches. On sites with greater than eight inches of precipitation annually, the effective moisture available is less than this because of harsh growing conditions;
   e) potential total annual biomass production generally is less than or equal to 400 pounds (even in favorable years);
   f) potential vegetative cover generally ranges from 15 to 25 percent with a maximum value of 35 percent on the most productive sites.

Improvement in ecological condition through increases in production, litter cover, density and cover of desirable climax plant species takes a great deal of time on the low potential sites. Changes would be slow on the shrub dominated shadscale and/or Bailey greasewood types (Holmgren and Hutchings, 1972).

2) moderate potential sites:
   a) range seedings will succeed if slope and topography allow a seeding;
   b) soils are generally moderately deep to deep;
   c) annual precipitation generally ranges from 8 to 12 inches;
   d) total annual biomass production generally ranges from 400 to 800 pounds, at least (four soils with production values higher than this were assigned to the moderate category, rather than the high potential category, due to either the shallowness or alkalinity of the soil, or due to site domination by mountain mahogany);
   e) vegetative cover generally ranges from 25 percent to 35 percent with a maximum value of 55 percent on the most productive sites.

3) high potential sites:
   a) range seedings will succeed if slope and topography allow a seeding;
   b) soils are generally moderately deep to very deep;
   c) annual precipitation ranges from at least 10 inches to 14 inches, or extra moisture is available from runoff or high water table;
   d) total annual biomass production generally ranges from 800 to 1500 pounds, at least;
   e) vegetative cover generally ranges from 40 percent to 50 percent with a maximum value of 80 percent on the most productive sites.

Improvement in ecological condition on the moderate and high potential sites would occur at a much faster rate, but would be affected by initial condition and management practices.

These category assignments were made by BLM and SCS range specialists familiar with the range sites, their potential, and responses to management.

Table 2-1 of this appendix lists the assigned potentials, using the above criteria as a guide, for all the range sites encountered in the EIS area. Once these potentials were determined, the percents of acres shifting from one condition class to another were estimated for the No Action alternative at five years and ten years in the future.

A comparison of Table 2-1 of this section and Table 3-1 of Appendix C, Section 2, shows that 13 sites, generally having moderate or high potential when a tree overstory is absent, currently have some percentage of their total acres covered by 10 percent or greater tree overstory. It is felt that a tree overstory of 10 percent or greater will reduce the potential of a site by one category. Therefore, following is a list of those 13 sites and their modified site potentials:

	% low potential	% mod. potential	% high potential
Loamy 10-12"pz 23-20	13	87	
Loamy 12-14"pz 26-05		60	40
Granitic Uplands 10-12"pz 26-06	2	98	
Steep North Slopes 14-20"pz 26-07		4	96
Granitic Fan 10-12"pz 26-08	33	67	
Loamy 10-12"pz 26-10	45	55	
South Slopes 8-12"pz 26-11	49	51	
Dunes 10-12"pz 26-14	1	99	
Shallow Loam 10-12"pz 26-15	57	43	
Juniper Savannah 10-12"pz 26-17	41	59	
Shallow Granitic Upland 10-12"pz 26-18	4	96	
Sandy 8-10"pz 26-20	1	99	
Upland Browse 12-16"pz 26-40	81	19	

Note: Title clarification: Loamy (range site name); 10-12"pz (precipitation zone); 26-10 (Major Land Resource Area [MLRA] number designation & range site number assignment in MLRA-26)

These modified site potentials were then used for these 13 sites when predicting future changes in vegetation condition.

Based on the applicable references cited in the vegetation sections on ecological condition and trend, knowledge of the resource area range site potentials and judgement of BLM and SCS range specialists familiar with the determination of ecological condition, the following estimates were determined to project future changes in ecological condition.

PROPOSED ACTION, MAXIMIZATION OF LIVESTOCK, RESOURCE PROTECTION

The timing of management actions and resulting improvements in vegetation condition and trend varies with the alternative. Adjustments in livestock numbers in the Resource Protection Alternative are proposed to occur within five years of implementation. In the other two alternatives, this action may take longer depending upon the progress of the CRMP effort. Regardless of this possibility, the degree of improvement in vegetation condition and trend is expected to be the same, or very similar, in all three alternatives given the same period of time following implementation.

Category I allotments are expected to have a variety of range improvements and grazing systems applied to attain improvement in vegetation condition and trend. In addition, it is assumed that revised monitoring and study procedures will be implemented, resulting in futher improvements in the vegetation resource (Appendix E, Section 1). Category M and C allotments may have less intensive management actions taken, based upon monitoring study results, to maintain or improve vegetation condition and trend. This possibility, plus the above mentioned assumption (Appendix E, Section 1) are the basis for predicting some improvement in ecological and forage condition in Category M and C allotments.

The following estimates predicting the percent of acres shifting from one condition class to another were made with the above mentioned assumption in mind (Table 2-3 of this section).

NO ACTION ALTERNATIVE

Improvement in ecological and forage condition is dependent primarily upon range site potential and current vegetation trend. Following are estimates of the percent of acres shifting from one condition class to another assuming that current trend will be maintained with the continuation of current management practices (Table 2-2 of this section).

TABLE 2-1
RANGE SITE AND ACREAGE TABLUATIONS BY SITE
RENO EIS AREA

RANGE SITE NUMBER	RANGE SITE NAME AND PRECIPITATION ZONE (INCHES PER YEAR)	POTENTIAL [a/]	ACREAGE	PERCENT OF AREA	PRODUCTION [b/] (POUNDS PER ACRE)
D-22-995(2)	Aspen Slopes 20 - 24" pz	high	41	<1	2000 - 3000
D-22-994(3)	Grazable P/J Woodland 16 - 24" pz	low	3,704	1	450 - 750
D-22-997(5)	Grazable Jeffrey Pine Woodland 16 - 24" pz	low	164	<1	400 - 900
D-22-998	Jeffrey Pine Woodland	low	2,557	<1	
D-22-999	White Fir Woodland	low	333	<1	
D-23-04	Loamy 5 - 8" pz	low	4,631	1	150 - 300
D-23-05	Dry Floodplain 8 - 10" pz	moderate	278	<1	400 - 600
D-23-06	Loamy 8 - 10" pz	moderate	1,085	<1	300 - 500
D-23-11	Sands 8 - 10" pz	moderate	114	<1	250 - 600
D-23-15	Stony Loams 12 - 14" pz	moderate	3,545	1	650 - 1050
D-23-17	Stony Claypan 12 - 16" pz	moderate	1,058	<1	300 - 650
D-23-20	Loamy 10 - 12" pz	moderate	20,330	3	600 - 1100
D-23-21	Claypan 10 - 14" pz	low	1,325	<1	200 - 450
D-23-25	Wet Meadow 10 - 20" pz	high	87	<1	1500 - 3500
D-23-28	Aspen Slopes 12 - 16" pz	high	345	<1	2000 - 3000
D-23-998	Claypan 10 - 12" pz	low	1,002	<1	300 - 500
D-23-999	Eroded South Slope 8 - 10" pz	low	1,417	<1	150 - 300

	PERCENT COVER	PERCENT GRASSES, FORBS, AND SHRUBS	ELEVATION (100 ft.)	SOIL CHARACTERISTICS	LAND FORM	ASSOCIATED SPECIES
	35 - 50	35 - 15 - 50	65 - 95	deep-very deep loamy	lower slopes, foothills	aspen, white fir, mountain big sagebrush, mountain brome
	25 - 35	30 - 10 - 60	55 - 65	shallow, clay loam	lower slopes, foothills	singleleaf pinyon, antelope bitterbrush, Thurber needlegrass, mountain big sagebrush
	30 - 40	35 - 10 - 50	50 - 65	mod. deep loam clay subsoil	lower slopes	Jeffrey pine, antelope bitterbrush, muttongrass
N/A -	Woodland Site					
N/A -	Woodland Site					
	5 - 7	15 - 5 - 80	45 - 55	mod. deep loamy	alluvial fans, terraces, slopes	Indian ricegrass, squirreltail, shadscale
	10 - 12	40 - 15 - 45	45 - 55	deep silty clay loam	flood-plains	Great Basin wildrye, basin big sagebrush
	5 - 10	45 - 10 - 45	45 - 55	shallow sand loam	sloping terraces, fans	Indian ricegrass, Wyoming big sagebrush, squirreltail
	5 - 8	45 - 15 - 40	45 - 50	mod. deep-deep sandy	stabilized sand dunes, slopes	Indian ricegrass, needle & threadgrass, basin big sagebrush
	20 - 30	55 - 15 - 30	50 - 70	shallow loamy	hills, upland slopes	bluebunch wheatgrass, arrowleaf balsamroot, antelope bitterbrush
	20 - 25	50 - 15 - 35	55 - 75	deep cobbly loam	gentle - moderate upland slopes	bluebunch wheatgrass, lupine, low sagebrush
	10 - 20	65 - 10 - 25	55 - 65	mod. deep-deep loamy	rolling uplands, alluvial fans	bluebunch wheatgrass, Thurber needlegrass, Wyoming big sagebrush
	5 - 15	50 - 15 -35	55 - 65	shallow, clay loam - loamy	gentle sloping table lands, low hill	Sandberg bluegrass & low sagebrush
	40 - 65	80 - 15 - 5	45 - 80	wet, peat-muck	poorly drained plains & basins	Nevada bluegrass, tufted hairgrass, fine-leaf sedge, willows
	20 - 40	40 - 25 - 35	60 - 85	mod. deep-deep loamy	mountain slopes	quaking aspen, mt. brome, snowberry
	25 - 35	55 - 15 - 30	50 - 60	mod. deep clay loam - loamy	alluvial fans, terraces uplands	bluebunch wheatgrass, low sagebrush, antelope bitterbrush
	15 - 25	50 - 10 - 40	45 - 55	shallow - mod deep loamy	south foothill slopes	purple sage, antelope bitterbrush, desert needlegrass

TABLE 2-1
RANGE SITE AND ACREAGE TABLUATIONS BY SITE
RENO EIS AREA

RANGE SITE NUMBER	RANGE SITE NAME AND PRECIPITATION ZONE (INCHES PER YEAR)	POTENTIAL[a/]	ACREAGE	PERCENT OF AREA	PRODUCTION [b/] (POUNDS PER ACRE)
D-23-997	Stony South Slopes 10 - 12" pz	moderate	4,409	<1	600 - 800
D-24-03	Desert Sodic Terrace 6 - 10" pz	low	252	<1	300 - 600
D-24-04	Silty Plain 4 - 12" pz	low	2,121	<1	200 - 500
D-26-01	Moist Floodplain 8 - 10" pz	high	53	<1	2000 - 3000
D-26-02	Wet Sodic Bottom 8 - 10" pz	moderate	400	<1	1200 - 2000
D-26-03	Wet Meadow 10 -14" pz	high	388	<1	1000 - 2000
D-26-05	Loamy 12 - 14" pz	high	51,611	8	800 - 1100
D-26-06	Granitic Uplands 14 - 16" pz	moderate	8,253	1	800 - 1000
D-26-07	Steep North Slopes 14 - 20" pz	high	3,408	1	600 - 1000
D-26-08	Granitic Fan 10 - 12" pz	moderate	12,539	2	600 - 1000
D-26-09	Mahogany Slopes 14 - 18" pz	low	4,504	1	600 - 1000
D-26-10	Loamy 10 - 12" pz	moderate	72,633	11	600 - 900
D-26-11	South Slope 8 - 12" pz	moderate	5,500	1	600 - 800
D-26-12	Sodic Terrace 8 - 10' pz	moderate	842	<1	1000 - 1200
D-26-13	Sodic Floodplain 8 - 10" pz	moderate	43	<1	500 - 800

PERCENT COVER	PERCENT GRASSES, FORBS, AND SHRUBS	ELEVATION (100 ft.)	SOIL CHARACTERISTICS	LAND FORM	ASSOCIATED SPECIES
35 - 45	55 - 15 - 30	55 - 65	shallow - mod. deep loamy	steep south	Wyoming big sagebrush, bluebunch wheatgrass, green ephedra
8 - 15	10 - 5 - 85	40 - 50	shallow - mod. deep silt loam	alluvial terraces & fans	bottlebrush squirreltail, black greasewood, shadscale
5 - 7	15 - 5 - 80	40 - 70	deep silty loam	alluvial fans & old lake terraces	Indian ricegrass, globemallow, winter-fat
70 - 85	75 - 10 - 15	40 - 50	deep loamy	floodplains	creeping wildrye, Great Basin wildrye, willow
60 - 80	85 - 5 - 10	40 - 56	deep loamy	river channels above floodplains	inland saltgrass, alkali seepweed, black greasewood
80 - 90	80 - 15 - 5	50 - 65	very deep loamy	along streams	tufted hairgrass, Nevada bluegrass, wild rose
65 - 80	55 - 15 - 30	60 - 75	mod. deep-deep loamy	north & east mtn. slopes	mtn. big sagebrush, bitterbrush, western needlegrass
45 - 55	55 - 10 - 35	50 - 80	mod. deep-deep sandy loam	mountain uplands	mtn. big sagebrush, bitterbrush, Thurber needlegrass
65 - 80	55 - 15 - 30	50 - 80	mod. deep-deep loamy	steep mtn. north slopes	Idaho fescue mtn. big sagebrush bitterbrush
45 - 55	50 - 10 - 40	45 - 55	very deep sandy loam	alluvial fans	mountain big sagebrush, bitterbrush, Indian ricegrass
30 - 60	15 - 5 - 70	75 - 90	deep loam or sandy loam	mtn. slopes, canyons & ridges	curlleaf mtn. mahogany, snowberry, mtn. big sagebrush
35 - 45	55 - 15 - 30	55 - 65	mod. deep-deep sandy loam or loamy	alluvial fans, rolling uplands or terraces	Wyoming big sagebrush, antelope bitterbrush, Thurber, needlegrass
25 - 35	60 - 10 - 30	60 - 72	shallow loamy	steep upland south slopes	Wyoming big sagebrush, desert needlegrass, green ephedra
45 - 55	35 - 10 - 55	45 - 50	very deep loamy	river terraces & alluvial toe slopes	black greasewood, basin big sagebrush, Great Basin wildrye
55 - 70	75 - 5 - 20	38 - 55	very deep loamy	low river terraces & basin plains	black greasewood, inland saltgrass, alkali sacaton

TABLE 2-1
RANGE SITE AND ACREAGE TABLUATIONS BY SITE
RENO EIS AREA

RANGE SITE NUMBER	RANGE SITE NAME AND PRECIPITATION ZONE (INCHES PER YEAR)	POTENTIAL [a/]	ACREAGE	PERCENT OF AREA	PRODUCTION [b/] (POUNDS PER ACRE)
D-26-14	Dunes 10 -12" pz	moderate	5, 445	1	600 - 800
D-26-15	Shallow Loam 10 - 12"pz	moderate	54,815	8	450 - 700
D-26-16	Loamy 8 - 10" pz	moderate	28,019	4	400 - 800
D-26-17	Juniper Savannah 10 - 12" pz	moderate	52,499	8	500 - 700
D-26-18	Shallow Granitic Upland 10 - 12" pz	moderate	39,929	6	400 - 800
D-26-19	Churning Clay 10 -12" pz	low	259	<1	500 - 800
D-26-20	Sandy 8 - 10" pz	moderate	22,447	3	400 - 800
D-26-21	Sodic Flat 5 - 10" pz	low	573	<1	300 - 600
D-26-22	Shallow Stony Loam 8 - 10" pz	low	17,584	3	300 - 600
D-26-23	Claypan 10 - 12" pz	low	37,821	6	300 - 500
D-26-24	Droughty Loam 6 - 8" pz	low	6,828	1	200 - 400
D-26-25	Claypan 8 - 10" pz	low	76,751	12	200 - 400
D-26-26	Granitic Upland 10 - 12" pz	low	116	<1	200 - 300
D-26-27	Churning Clay 8 - 10" pz	low	1,806	<1	200 - 400
D-26-28	Mountain Ridges 12 - 16" pz	low	12,811	2	150 - 350

PERCENT COVER	PERCENT GRASSES, FORBS, AND SHRUBS	ELEVATION (100 ft.)	SOIL CHARACTERISTICS	LAND FORM	ASSOCIATED SPECIES
20 - 30	45 - 5 - 50	50 - 55	very deep sandy loam or loamy	eaolian slopes	antelope bitterbrush, desert peach, needle and thread grass
30 - 40	55 - 15 - 30	50 - 60	shallow loam to soft bedrock	uplands & pediments	Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass
20 - 30	55 - 15 - 30	44 - 55	very deep, well drained loamy	alluvial fans, rolling uplands & terraces	Wyoming big sagebrush, desert peach, Thurber needlegrass
30 - 40	50 - 10 - 40	45 - 60	shallow to mod. deep loamy	alluvial fans, terraces, sloping uplands	Western juniper, Wyoming big sagebrush, antelope bitterbrush
45 - 55	45 - 10 - 45	50 - 60	shallow to bedrock	foothills, slopes with granitic outcrops	Wyoming big sagebrush, desert needlegrass, antelope bitterbrush
25 - 35	50 - 5 - 45	48 - 52	deep - loamy	level & slight slopes, upland terraces	Wyoming big sagebrush, little horsebrush, western wheatgrass
25 - 35	55 - 10 - 35	45 - 60	mod. deep-deep sandy loam	alluvial fans	Wyoming big sagebrush, needle & threadgrass, Indian ricegrass
35 - 45	20 - 5 - 75	35 - 50	sodic crust - shallow	floodplain, bottoms, valley floors	black greasewood, inland saltgrass, Great Basin wildrye
20 - 30	45 - 10 - 45	45 - 55	shallow loam to bedrock	side slopes of foothills	Wyoming big sagebrush, green ephedra, desert needlegrass
25 - 35	55 - 10 - 35	60 - 65	mod. deep-deep loamy	old terraces & uplands	low sagebrush, Thurber needlegrass & squirreltail
15 - 20	15 - 5 - 80	44 - 52	mod. deep loamy	alluvial fans	Wyoming big sagebrush
20 - 30	55 - 10 - 35	50 - 60	mod. deep-deep loamy	old terraces & uplands	low sagebrush, Thurber needlegrass & squirreltail
15 - 25	20 - 10 - 70	45 - 65	deep sandy	uplands - granitic rock outcrops	Wyoming big sagebrush, desert peach
15 - 25	55 - 10 - 35	25 - 60	deep loamy	level - slighty sloping	squirreltail, littleleaf horsebrush
20 - 40	45 - 15 - 40	65 - 100	shallow loam - hard bedrock	mtn. ridges, uplands	low sagebrush, Thurber needlegrass

TABLE 2-1
RANGE SITES AND ACREAGE TABULATION BY SITE
RENO EIS AREA

RANGE SITE NUMBER	RANGE SITE NAME AND PRECIPITATION ZONE (INCHES PER YEAR)	POTENTIAL [a/]	ACREAGE	PERCENT OF AREA	PRODUCTION [b/] (POUNDS PER ACRE)
D-26-29	Eroded Slopes 8 - 12" pz	low	15,075	2	100 - 200
D-26-30	Loamy Bottom 8 - 12" pz	high	134	<1	1500 - 2500
D-26-38	Loamy 14 - 18" pz	high	6,791	1	800 - 1500
D-26-39	Claypan 12 - 18" pz	moderate	515	<1	200 - 500
D-26-40	Upland Browse 12 - 16" pz	moderate	1,100	<1	800 - 1500
D-27-979(01)	Desert Lake Bars 4 - 8" pz	low	2,957	<1	50 - 200
D-27-980(02)	Desert Sands 4 - 8" pz	moderate	2,102	<1	200 - 600
D-27-984(06)	Desert Stony Loam 4 - 8" pz	low	12,065	2	150 - 450
D-27-988(10)	Desert Fans & Terraces 4 - 8"pz	low	2,690	<1	200 - 400
D-27-989	Sandy Loam 6 - 8" pz	moderate	266	<1	350 - 700
D-27-990	Sandy 6 - 8" pz	moderate	24	<1	300 - 600
D-27-991	Stony Claypan 6 - 8" pz	low	28,666	4	250 - 450
D-27-994	Stony Claypan 4 - 6" pz	low	2,943	<1	200 - 400
D-27-995	Shallow Loam 4 - 6" pz	low	4,517	1	50 - 200
D-27-996	Stony Loam 4 - 6" pz	low	1,012	<1	50 - 200

PERCENT COVER	PERCENT GRASSES, FORBS, AND SHRUBS	ELEVATION (100 ft.)	SOIL CHARACTERISTICS	LAND FORM	ASSOCIATED SPECIES
10 - 20	35 - 10 - 55	50 - 60	shallow loamy	sideslopes & dissected fans, terraces	Wyoming big sagebrush, purple sage, desert needlegrass
45 - 55	70 - 10 - 20	46 - 65	loamy	bottoms, valley floors	Great Basin wildrye, basin big sagebrush, Nevada bluegrass
45 - 65	55 - 15 - 30	55 - 80	stony, mod. deep loamy	north & east mountain	western needlegrass, mtn. big sagebrush, Columbia needlegrass
25 - 35	55 - 10 - 35	60 - 80	mod. deep-deep clay loam	mtn. slopes saddle areas	low sagebrush, Thurber needlegrass, antelope bitterbrush
45 - 65	45 - 10 - 45	65 - 90	mod. deep-deep stony loam	rocky mountain slopes and ridges	antelope bitterbrush, mtn. big sagebrush, snowberry, Columbia needlegrass
10 - 20	30 - 10 - 60	38 - 44	mod. deep sandy loam	terraces, alluvial fans, uplands	Bailey greasewood, shadscale, Indian ricegrass
15 - 25	60 - 5 - 35	40 - 54	deep sandy loam	alluvial fans, terraces	Indian ricegrass, Bailey greasewood, four-wing saltbush
10 - 20	20 - 5 - 75	44 - 60	shallow sandy loam	mod. steep terraces, fans, foothills	Bailey greasewood, shadscale, Indian ricegrass, galleta grass
10 - 20	20 - 5 - 75	40 - 60	shallow - mod. deep, loamy	alluvial fans & terraces	shadscale, winterfat, Indian ricegrass, squirreltail
25 - 30	40 - 15 - 45	45 - 60	shallow - deep sandy loam	foothill & mtn. sideslopes	Wyoming big sagebrush, spiny hopsage, Indian ricegrass
25 - 30	35 - 5 - 60	45 - 60	mod. deep-deep sandy loam - sandy	alluvial fans	Wyoming big sagebrush, spiny hopsage, Indian ricegrass
20 - 30	40 - 10 - 65	50 - 60	mod. deep-deep loamy	terraces & uplands	low sagebrush, bud sagebrush, galleta grass
20 - 30	40 - 5 - 55	45 - 60	mod. deep-deep loamy	old terraces & uplands	low sagebrush, bud sagebrush, desert needlegrass
5 - 10	30 - 5 - 65	45 - 60	shallow - mod. deep loamy	sideslopes of foothills	low sagebrush, shadscale, bud sagebrush, Indian ricegrass
5 - 10	35 - 5 - 60	40 - 55	shallow - mod. deep sandy loam	sideslopes of mtns. & foothills	shadscale, bud sagebrush, galleta grass

TABLE 2- 1
RANGE SITES AND ACREAGE TABULATION BY SITE
RENO EIS AREA

RANGE SITE NUMBER	RANGE SITE NAME AND PRECIPITATION ZONE (INCHES PER YEAR)	POTENTIAL a/	ACREAGE	PERCENT OF AREA	PRODUCTION b/ (POUNDS PER ACRE)
D-27-998(90)	Shallow Loam 8 - 10" pz	low	4,868	1	400 - 600
D-27-999(91)	Sodic Flat 5 - 8" pz	low	5,062	1	70 - 300
Badlands			386	<1	
Total			657,898	100	

a/ See Appendix _____ for explanation of defining characteristics.

b/ Range is from unfavorable to favorable years.

Source: Soil Conservation Service & Bureau of Land Management, Carson City District files, 1980.

PERCENT COVER	PERCENT GRASSES, FORBS, AND SHRUBS	ELEVATION (100 ft.)	SOIL CHARACTERISTICS	LAND FORM	ASSOCIATED SPECIES
25 - 35	55 - 15 - 30	41 - 50	shallow loamy	terraces, sediments, rolling uplands	Wyoming big sagebrush, Thurber needlegrass, spiny hopsage
10 - 20	15 - 5 - 80	35 - 45	mod. deep-deep loamy	basins, low lake terraces	black greasewood, shadscale, Indian ricegrass

APPENDIX E, SECTION 2
TABLE 2-2
PREDICTED PERCENT OF ACRES SHIFTING FROM ONE CONDITION CLASS TO ANOTHER AT FIVE AND TEN YEARS IN THE FUTURE
NO ACTION ALTERNATIVE

	CURRENT ALLOTMENT TREND	LOW POTENTIAL SITES			MODERATE POTENTIAL SITES			HIGH POTENTIAL SITES		
		Conditon Classes			Conditon Classes			Conditon Classes		
		poor v fair	fair v good	good v excel	poor v fair	fair v good	good v excel	poor v fair	fair v good	good v excel
Five years in the future	Up	0	0	0	0	+5	0	+5	+10	+5
	Static	0	0	0	0	0	0	0	0	0
	Down	-5	-5	0	-5	-10	0	-5	-5	0
Ten years in the future	Up	0	0	0	+5	+5	0	+5	+10	+5
	Static	0	0	0	0	0	0	0	0	0
	Down	-5	-5	0	-5	-10	0	-5	-5	0

APPENDIX E, SECTION 2
TABLE 2-3
PREDICTED PERCENT OF ACRES SHIFTING FROM ONE CONDITION CLASS TO ANOTHER AT FIVE AND TEN YEARS IN THE FUTURE
PROPOSED ACTION, RESOURCE PROTECTION, MAXIMIZATION OF LIVESTOCK ALTERNATIVES

	ALLOTMENT MANAGEMENT CATEGORY	LOW POTENTIAL SITES			MODERATE POTENTIAL SITES			HIGH POTENTIAL SITES		
		Conditon Classes			Conditon Classes			Conditon Classes		
		poor v fair	fair v good	good v excel	poor v fair	fair v good	good v excel	poor v fair	fair v good	good v excel
Five years in the future	Maintenance	0	0	0	0	+5	0	+5	+5	0
	Improvement									
	Static & Upward	+5	+5	0	+5	+10	+5	+10	+15	+10
	Down	0	0	0	0	+5	0	+5	+10	+5
	Custodial	0	0	0	0	0	0	0	+5	0
Ten years in the future	Maintenance	0	0	0	+5	+5	0	+5	+10	+5
	Improvement	+5	+10	+5	+10	+15	+10	+15	+20	+10
	Custodial	0	0	0	0	+5	0	+5	+5	0

(Note: It was assumed that all allotments would have upward trend within ten years)

APPENDIX F

METHODOLOGY FOR PREDICTING IMPROVEMENT OR DETERIORATION OF VEGETATION CONDITION

APPENDIX F

METHODOLOGY FOR PREDICTING THE IMPROVEMENT OR DETERIORATION OF VEGETATION CONDITION

A step by step analysis of an example would be the best approach in explaining how these estimates of future shifts in acres from one condition class to another were applied in the Proposed Action, No Action, Maximization of Livestock and Resource Protection alternatives.

Refer to the example Figure 1-4 in this section. This form is a summary of the acreage tabulation for the Gold Hill allotment. The acres are listed by range site and condition class. This information was summarized from the 1978-1980 SVIM inventory data which were tabulated and compiled by allotment on the 'Vegetation Inventory Write-up Summary by Allotment' form (1978-1980 SVIM data available for review at the Carson City District Office). Following is an analysis of Figure 1-4:

1) Column 1:

Section A - The letters L,M,H denote low, medium, or high potential for the range site; this is referenced from Appendix E, Section 2, Table 2-1. The letter T indicates that woodland acres are present in this range site;

Section B - The first entry (i.e. 26) is the Major Land Resource Area number; the second entry is the range site identification number; together these reference a specific range site (Table 2-1, Appendix E, Section 2).

Section C - These entries include the number of acres of woodland occurring on the specific range sites and the condition class (e.g., P indicates poor condition; F, fair) associated with woodland acres.

2) Column 2 summarizes the current vegetation condition in the allotment:

Section A - summarizes the number of acres by range site and ecological condition class.

Section B - summarizes the number of acres by range site and forage condition class.

3) Columns 3 and 4 summarize the information as described in column 2 once the data in column 2 is treated with the estimates for predicting shifts in acres from one condition class to another. Column 3 is a summary of the vegetation condition five years in the future, and Column 4, ten years in the future.

Appendix F, Tables 1-1 through 1-7, must be referenced to determine current trend for each allotment (e.g., Gold Hill currently has upward trend).

Following are two examples of the calculations necessary, using the estimates from Appendix E, Section 2, Table 2-2 predicting future condition, to determine the overall change in vegetation condition at five years and 10 years in the future in the Gold Hill allotment.

1) Reference 26-11 in column 1, section B; the entry in section A indicates moderate potential; 183 acres are currently in poor condition; Section C indicates no woodland is present; current trend is up.

2) Reference Table 2-2 Appendix E, Section 2 for the predicted percent of acres shifting from one condition class to another; in 5 years, 0 percent of poor acres will shift to fair condition and 5 percent of fair acres will shift to good condition; in 10 years, 5 percent of poor acres will shift to fair condition and 5 percent of fair acres will shift to good condition.

3) Calculations are as follows:

A) at 5 years: 183 x no change = 183 (no acreage shift) Enter in column 3, section A: 183 acres in poor condition.

B) at 10 years: (note that the predicted percent of acres shifting from one condition class to another are applied to the results of the 5 year calculations) 183 x .05 (5%) = 9 with a balance of 174

Enter in column 4, section A: 9 acres in fair condition and 174 acres in poor condition.

4) Reference 26-15 in column 1, section B; the entry in section A for this range site indicates moderate potential, and that woodland is present (T); the entries in section C indicate 1501 acres of woodland in poor condition and 147 acres of woodland in fair condition (note that, as discussed earlier in this appendix, woodland acres were treated as having site potential one category lower than that normally assigned the site the woodland occurs in. Here, the woodland acres would have low potential rather than moderate potential); a total of 1,981 acres are in poor condition and 223 acres are in fair condition; current trend is up.

5) Reference Table 2-2, Appendix E, Section 2 for the predicted percent of acres shifting from one condition class to another; in 5 years, for the acres having moderate potential, 0 percent of poor acres will shift to fair condition and 5

percent of fair acres will shift to good condition; in 5 years, for the acres of woodland having low potential, no changes in condition will occur; in 10 years, for the acres of moderate potential, 5 percent of poor acres will shift to fair condition and 5 percent of fair acres will shift to good condition; in 10 years, for the acres of woodland having low potential, no change in condition will occur.

6) This example is more complex due to the occurrence of woodland in both the poor and fair condition classes. Calculations must be addressed in a different fashion as follows:

A) At five years:

POOR CONDITION ACRES	FAIR CONDITION ACRES	GOOD CONDITION ACRES	EXCELLENT CONDITION ACRES
1501 (woodland; low potential; no change)	147 (woodland; low potential; no change)		
480 (moderate potential; 1,981 acres minus 1501 acres of woodland; no change)	76 (moderate potential; 223 minus 147 acres woodland) x .05 (5%) = 4 with a balance of 72		

B) At ten years: (note that the predicted percent of acres shifting from one condition class to another are always applied to the results of the 5 year calculation; also, moderate potential estimate values and low potential values are again used since woodland is present):

POOR CONDITION ACRES	FAIR CONDITION ACRES	GOOD CONDITION ACRES	EXCELLENT CONDITION ACRES
1501 (woodland; low potential; no change)	147 (woodland; low potential; no change)	4 (moderate potential; no change)	
480 (moderate potential) x .05 (5%) = 24 with a balance of 456	72 (moderate potential) x .05 (5%) = 4 with a balance of 68		

Enter in column 4, section A: 8 acres in good condition (4 plus 4), 239 acres in fair condition (147 plus 68 plus 24), and 1,957 acres in poor condition (456 plus 1,508).

This method of calculation was used to predict changes in ecological and forage condition on an allotment by allotment basis. The results of these calculations were summarized then in Tables 1-1, 1-3, 1-5 and 1-7, Appendix F, Section 1 for the Proposed Action, No Action, Maximization of Livestock and Resource Protection Alternatives.

PROPOSED ACTION

APPENDIX F, TABLE 1-1
ECOLOGICAL RANGE AND FORAGE CONDITION (ACRES)
PROPOSED ACTION ALTERNATIVE

	PRESENT							FIVE YEARS		
	ECOLOGICAL CONDITION			FORAGE CONDITON			TREND	ECOLOGICAL CONDITION		
	GOOD	FAIR	POOR	GOOD	FAIR	POOR		EXCEL.	GOOD	FAIR
CATEGORY M										
Bagley Valley	1,770	3,678					down		1,886	3,562
Barney Riley		1,965					up		34	1,931
Carter Station		654	477				down			654
Hallelujah Junction	49	1,955	2,481	2,957	2,388	1,999	up		131	1,873
Hardscrabble	3,912	7,324	209				static		3,988	7,248
Harvey Flat	704	3,575					static		711	3,568
Haypress		1,440					down		54	1,386
Indian Hills		1,032	2,111				up		51	981
Millberry Canyon[b]	-	-	-				-		-	-
Wade Valley	36	628					up		42	622
SUBTOTAL:	6,471	22,251	5,278	2,957	2,388	1,999			6,897	21,825
CATEGORY I										
Antelope Mountain	2,392	31,225	22,074				static	120	5,112	29,487
Big Canyon	1,231	2,443	10,103				down	7	1,279	2,534
Buckeye[a]	103	16,001	71,042				down	2	325	15,426
Churchill Canyon	4,733	5,859	30,147				down	23	4,797	5,777
Constantia	284	8,661	9,245	104	827		down		588	7,346
Flanigan	14,156	26,460	9,498				down	34	14,626	25,961
Hungry Valley	271	23,184	1,906				down		898	21,957
Paiute Canyon	3,100	21,250	11,438				down		3,811	20,167
Pinenut	6	5,447	13,269				down		75	5,415
Shovel Springs	139	6,182	3,390				down		381	5,940
Sunrise	138	889	15,366				static	2	269	1,737
Winnemucca Ranch	3,197	22,924	16,631				down		4,311	21,092
SUBTOTAL:	29,750	170,525	214,109	104	827			188	36,472	162,839
CATEGORY C										
Black Springs[b]	-	-	-				-		-	-
Carson Plains		344	4,383				down			344
Clifton	30	696	15,844				static		44	682
Cottonwood	344	2,737	375				static		344	2,737
Diamond Valley[b]	-	-	-				-		-	-
Double Springs		276	442				static		1	275
Dry Lake		2,091	777				up			2,091
Duck Hill		1,766	2,768				static			1,766
Eldorado			9,609				down			
Faye Canyon[b]		-	-				-		-	-
Galena Creek		1,554	179				static			1,554
Gold Hill	1,195	2,288	14,369				up		1,195	2,288
Hackett Canyon		3,857	2,741				down		7	3,850
Hangman[b]	-	-	-				-		-	-
Haskell Peak		2,258	736				static		26	2,232
Indian Creek		322	1,981				down			322
Jumbo		10,230	4,999				down		37	10,193
Kings Canyon		996	1,672				down			996
Koch Ditch		282	84				down			282
Luther Creek[b]	-	-	-				-		-	-
Mill Canyon		2,325	13,456				down		11	2,314
Mud Lake		1,202	1,536				down			1,202
Mustang	36	259	7,334				static		36	259
Olinghouse	10,089	13,489	4,174				down		10,114	13,464
Pah Rah	974	3,530					static		974	3,530
Peavine Mountain		3,133	882				static		38	3,095
Peavine Watershed		1,277	1,638				up			1,277
Plumas Station	76	1,911	2,409	1,309	616	368	down		76	1,911
Prison Hill		1,903	511				up			1,903
Rawe Peak		887	5,387				down			887
Sand Canyon	50	110	2,951				down		50	110
Spanish Springs		101	8,961				static			101
Spratt Creek[b]	-	-	-				-		-	-
Wedekind[b]	-	-	-				-		-	-
White Hills	1,758	10,004	3,982				down		1,806	9,956
SUBTOTAL:	14,552	69,828	114,180	1,309	616	368			14,759	69,621
TOTAL	50,773	262,604	333,567	4,370	3,831	2,367			58,128	254,285

[a] Buckeye, Jacobsen and Fish Springs were combined under the Buckeye Allotment.
[b] No information available.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1978-1980.

					TEN YEARS							
	FORAGE CONDITION				ECOLOGICAL CONDITION				FORAGE CONDITION			
POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR
					12	2,078	3,358					
					2	96	1,867					
477							655	476				
2,481		3,059	2,286	1,999		209	1,892	2,384		3,156	2,289	1,899
209					49	4,067	7,126	203				
						718	3,561					
					3	154	1,283					
2,111						100	1,038	2,005				
-					-	-	-	-				
						47	617					
5,278		3,059	2,286	1,999	66	7,469	21,397	5,068		3,156	2,289	1,899
20,972					615	8,764	27,258	19,054				
9,957					105	1,501	3,096	9,075				
70,038			1,355		34	2,075	19,010	64,672		1,355		
30,142					289	5,192	6,883	28,375				
8,256		146	2,785		59	1,553	6,983	7,595	15	2,248	668	
9,493					932	16,790	23,711	8,681				
1,906			600		77	3,613	19,354	1,717		600		
11,210			600		367	6,134	18,411	10,276		600		
13,232					8	675	5,631	12,408				
3,390					30	1,177	5,417	3,087				
14,385					22	520	2,676	13,175				
15,249			2,100		413	6,914	19,106	14,219		2,100		
208,230		146	7,440		2,951	54,908	157,536	192,334	15	6,903	668	
-						-	-	-				
4,383						13	331	4,383				
15,844						57	669	15,844				
375						440	2,641	375				
-						-	-	-				
442						6	271	441				
777						103	1,988	777				
2,768						54	1,713	2,767				
9,609							2	9,607				
-						-	-	-				
179						29	1,525	179				
14,369						1,261	2,241	14,350				
2,741						44	3,813	2,741				
-						-	-	-				
736						120	2,138	736				
1,981						9	313	1,981				
4,999						463	9,777	4,989				
1,672						38	958	1,672				
-							282	84				
84						-	-	-				
13,456						78	2,249	13,454				
1,536						28	1,175	1,535				
7,334						38	257	7,334				
4,174						10,368	13,210	4,174				
						1,086	3,418					
882						157	2,987	871				
1,638						24	1,253	1,638				
2,409		1,309	616	368		165	1,822	2,409		1,340	585	368
511						83	1,820	511				
5,387						45	876	5,353				
2,951						56	104	2,951				
8,961						2	99	8,961				
-						-	-	-				
-						-	-	-				
3,982						2,077	9,686	3,981				
114,180		1,309	616	368		16,844	67,618	114,098		1,340	585	368
327,688		4,514	10,342	2,367	3,017	79,221	246,551	311,500	15	11,399	3,542	2,267

APPENDIX F, TABLE 1-2
PERCENT CHANGE IN VEGETATION CONDITION
PROPOSED ACTION

ECOLOGICAL CONDITION (in terms of acres)

POOR	FAIR	GOOD	EXCELLENT	
333,567	262,604	50,773		Present
3,289	3,366			Proposed Seedings
330,278	259,238	50,773		Present Minus Seedings
311,500	246,551	79,221	3,017	Future
18,778	12,687	28,448	3,017	Change
				Total Native Range = 640,289
3% down	2% down	4% up	1% up	Percent Change

Results: 5% increase in good and excellent ecological condition.

FORAGE CONDITION (in terms of acres)

2,367	3,831	4,370		Present
2,267	3,542	4,744	15	Future
100	289	374	15	Change
				Total Existing Seedings = 10,568
1% down	3% down	4% up	0	Percent Change Plus 6655 Acres of Proposed Seeding in Good Forage Condition

Results: 4% increase in good forage condition.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1978-1980.

NO ACTION

APPENDIX F, TABLE 1-3
ECOLOGICAL RANGE AND FORAGE CONDITION (ACRES)
NO ACTION ALTERNATIVE

	PRESENT							FIVE YEARS		
	ECOLOGICAL CONDITION			FORAGE CONDITON			TREND	ECOLOGICAL CONDITION		
ALLOTMENT	GOOD	FAIR	POOR	GOOD	FAIR	POOR		GOOD	FAIR	POOR
Antelope Mountain	2,392	31,225	22,074				static	2,392	31,225	22,074
Bagley Valley	1,770	3,678					down	1,643	3,621	184
Barney Riley		1,965					up	68	1,897	
Big Canyon	1,231	2,443	10,103				down	1,145	2,406	10,226
Black Springs[b]	-	-	-				-	-	-	-
Buckeye[a]	103	16,001	71,042				down	94	15,209	71,843
Carson Plains		344	4,383				down		327	4,400
Carter Station		654	477				down		621	510
Churchill Canyon	4,733	5,859	30,147				down	4,497	5,804	30,438
Clifton	30	696	15,844				static	30	696	15,844
Constantia	284	8,661	9,245	104	827		down	256	8,256	9,678
Cottonwood Creek	344	2,737	375				static	344	2,737	375
Diamond Valley[b]	-	-	-				-	-	-	-
Double Springs		276	442				static			
Dry Lake		2,091	777				up	103	1,988	777
Duck Hill		1,766	2,768				static		1,766	2,768
Eldorado			9,609				down			9,609
Faye Canyon[b]		-	-				-	-	-	-
Flanigan	14,156	26,460	9,498				down	13,339	25,954	10,821
Galena Creek		1,554	179				static		1,554	179
Gold Hill	1,195	2,288	14,369				up	1,261	2,241	14,350
Hackett Canyon		3,857	2,741				down		3,665	2,933
Hallelujah Junction	49	1,955	2,481	2,957	2,388	1,999	up	90	1,914	2,481
Hangman[b]	-	-	-				-	-	-	-
Hardscrabble	3,912	7,324	209				static			
Harvey Flat	704	3,575					static			
Haskell Peak		2,258	736				static		2,258	736
Haypress		1,440					down		1,367	73
Hungry Valley	271	23,184	1,906				down	257	22,151	2,953
Indian Creek		322	1,981				down		306	1,997
Indian Hills		1,032	2,111				up	51	981	2,111
Jumbo		10,230	4,999				down		9,718	5,511
Kings Canyon		996	1,672				down		946	1,722
Koch Ditch		282	84				down		267	99
Luther Creek[b]	-	-	-					-	-	-
Mill Canyon		2,325	13,456				down		2,208	13,573
Millberry Canyon[b]	-	-	-					-	-	-
Mud Lake		1,202	1,536				down		1,142	1,596
Mustang	36	259	7,334				static	36	259	7,334
Olinghouse	10,089	13,489	4,174				down	9,569	13,335	4,848
Pah Rah	974	3,530					static	974	3,530	
Paiute Canyon	3,100	21,250	11,438				down	2,805	20,480	12,503
Peavine Mountain		3,133	882				static		3,133	882
Peavine Watershed		1,277	1,638				up	24	1,253	1,638
Pine Nut	6	5,447	13,269				down	6	5,176	13,540
Plumas Station	76	1,911	2,409	1,309	616	368	down	76	1,911	2,409
Prison Hill		1,903	511				up	83	1,820	511
Rawe Peak		887	5,387				down		842	5,432
Sand Canyon	50	110	2,951				down	47	107	2,957
Shovel Springs	139	6,182	3,390				down	132	5,879	3,700
Spanish Springs		101	8,961				static		101	8,961
Spratt Creek[b]	-	-	-				-	-	-	-
Sunrise	138	889	15,366				static	138	889	15,366
Wade Valley	36	628					up	42	622	
Wedekind[b]	-	-	-				-	-	-	-
White Hills	1,758	10,004	3,982				down	1,665	9,596	4,483
Winnemucca Ranch	3,197	22,924	16,631				down	2,891	22,081	17,780
TOTAL	50,773	262,604	333,567	4,370	3,831	2,367		48,674	255,414	342,856

a/ Buckeye, Jacobsen and Fish Springs were combined under the Buckeye Allotment.
b/ No information available.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1980-1981.

			TEN YEARS							
FORAGE CONDITION			ECOLOGICAL CONDITION				FORAGE CONDITION			
GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR
			3	2,392	31,225	22,074				
				1,526	3,555	367				
				126	1,836					
				1,067	2,364	10,346				
				-	-	-				
				86	14,458	72,602				
					310	4,417				
					588	543				
				4,273	5,736	30,730				
				30	696	15,844				
94	795	42		230	7,870	10,090		85	764	82
				344	2,737	375				
				-	-	-				
					276	442				
				210	1,923	744				
					1,766	2,768				
						9,609				
				-	-	-				
				12,574	25,421	12,119				
					1,554	179				
				1,326	2,498	14,028				
					3,482	3,116				
3,059	2,286	1,999		129	1,928	2,428		3,156	2,289	1,899
				-	-	-				
				3,912	7,324	209				
				704	3,575					
					2,258	736				
					1,298	142				
				243	20,950	4,168				
					291	2,012				
				100	1,038	2,005				
					9,234	5,995				
					899	1,769				
					253	113				
				-	-	-				
					2,098	13,683				
				-	-	-				
					1,085	1,653				
				36	259	7,334				
				9,075	13,161	5,516				
				974	3,530					
				2,539	19,721	13,528				
					3,133	882				
				47	1,269	1,599				
				6	4,917	13,799				
1,309	616	368		76	1,911	2,409		1,309	616	368
				163	1,766	485				
					799	5,475				
				45	104	2,962				
				125	5,591	3,995				
					101	8,961				
				-	-	-				
				138	889	15,366				
				47	617					
				-	-	-				
				1,578	9,203	4,963				
				2,613	21,253	18,886				
4,462	3,697	2,409	3	46,734	248,750	351,466	0	4,550	3,669	2,349

APPENDIX F
FIGURE 1-4

PREDICTED CHANGES IN ECOLOGICAL/FORAGE CONDITION

No Action
Gold Hill (up)

COLUMN 1 RANGE SITE INFORMATION			COLUMN 2 PRESENT SITUATION					
			A Ecological Condition			B Forage Condition		
A	B	C	Poor	Fair	Good	Poor	Fair	Good
HT	26-05	1195g-228p	607		1,195			
MT	26-10	404f	2,179	1,364				
M	26-11		183					
MT	26-15	147f-1501p	1,981	223				
MT	26-16	120f	168	401				
LT	26-22	255p	2,840					
L	26-23		2,867					
L	26-24			300				
L	26-25		3,544					
Badlands N/A 186								
Total (18,038)			14,369	2,288	1,195			

COLUMN 3 AT FIVE YEARS IN THE FUTURE							
A Ecological Condition				B Forage Condition			
Poor	Fair	Good	Excel	Poor	Fair	Good	Excel
588	19	1,195					
2,179	1,316	48					
183							
1,981	219	4					
168	387	14					
2,840							
2,867							
	300						
3,544							
14,350	2,241	1,261					

COLUMN 4 AT TEN YEARS IN THE FUTURE							
A Ecological Condition				B Forage Condition			
Poor	Fair	Good	Excel	Poor	Fair	Good	Excel
559	46	1,197					
2,070	1,379	94					
174	9						
1,957	239	8					
160	382	27					
2,840							
2,724	143						
	300						
3,544							
14,028	2,498	1,326					

MAXIMIZATION OF LIVESTOCK

APPENDIX F, TABLE 1-5
ECOLOGICAL RANGE AND FORAGE CONDITION (ACRES)
MAXIMIZATION OF LIVESTOCK ALTERNATIVE

	PRESENT							FIVE YEARS		
	ECOLOGICAL CONDITION			FORAGE CONDITON			TREND	ECOLOGICAL CONDITION		
	GOOD	FAIR	POOR	GOOD	FAIR	POOR		EXCEL.	GOOD	FAIR
CATEGORY M										
Bagley Valley	1,770	3,678					down		1,886	3,562
Barney Riley		1,965					up		34	1,931
Carter Station		654	477				down			654
Hallelujah Junction	49	1,955	2,481	2,957	2,388	1,999	up		131	1,873
Hardscrabble	3,912	7,324	209				static		3,988	7,248
Harvey Flat	704	3,575					static		711	3,568
Haypress		1,440					down		54	1,386
Indian Hills		1,032	2,111				up		51	981
Millberry Canyon[b]	-	-	-				-		-	-
Wade Valley	36	628					up		42	622
SUBTOTAL:	6,471	22,251	5,278	2,957	2,388	1,999			6,897	21,825
CATEGORY I										
Antelope Mountain	2,392	31,225	22,074				static	120	4,843	27,032
Big Canyon	1,231	2,443	10,103				down	7	1,279	2,534
Buckeye[a]	103	16,001	71,042				down	2	325	15,426
Churchill Canyon	4,733	5,859	30,147				down	23	4,797	5,777
Constantia	284	8,661	9,245	104	827		down		588	7,346
Flanigan	14,156	26,460	9,498				down	34	14,626	25,961
Hungry Valley	271	23,184	1,906				down		898	21,957
Paiute Canyon	3,100	21,250	11,438				down		3,811	20,167
Pinenut	6	5,447	13,269				down		75	5,415
Shovel Springs	139	6,182	3,390				down		381	5,940
Sunrise	138	889	15,366				static	2	269	1,737
Winnemucca Ranch	3,197	22,924	16,631				down		4,311	21,092
SUBTOTAL:	29,750	170,525	214,109	104	827			188	36,203	160,384
CATEGORY C										
Black Springs[b]	-	-	-				-		-	-
Carson Plains		344	4,383				down			344
Clifton	30	696	15,844				static		44	682
Cottonwood	344	2,737	375				static		344	2,737
Diamond Valley[b]	-	-	-				-		-	-
Double Springs		276	442				static		1	275
Dry Lake		2,091	777				up			2,091
Duck Hill		1,766	2,768				static			1,766
Eldorado			9,609				down			
Faye Canyon[b]		-	-				-		-	-
Galena Creek		1,554	179				static			1,554
Gold Hill	1,195	2,288	14,369				up		1,195	2,288
Hackett Canyon		3,857	2,741				down		7	3,850
Hangman[b]	-	-	-				-		-	-
Haskell Peak		2,258	736				static		26	2,232
Indian Creek		322	1,981				down			322
Jumbo		10,230	4,999				down		37	10,193
Kings Canyon		996	1,672				down			996
Koch Ditch		282	84				down			282
Luther Creek[b]	-	-	-				-		-	-
Mill Canyon		2,325	13,456				down		11	2,314
Mud Lake		1,202	1,536				down			1,202
Mustang	36	259	7,334				static		36	259
Olinghouse	10,089	13,489	4,174				down		10,114	13,464
Pah Rah	974	3,530					static		974	3,530
Peavine Mountain		3,133	882				static		38	3,095
Peavine Watershed		1,277	1,636				up			1,277
Plumas Station	76	1,911	2,409	1,309	616	368	down		76	1,911
Prison Hill		1,903	511				up			1,903
Rawe Peak		887	5,387				down			887
Sand Canyon	50	110	2,951				down		50	110
Spanish Springs		101	8,961				static			101
Spratt Creek[b]	-	-	-				-		-	-
Wedekind[b]	-	-	-				-		-	-
White Hills	1,758	10,004	3,982				down		1,806	9,956
SUBTOTAL:	14,552	69,828	114,180	1,309	616	368			14,759	69,621
TOTAL	50,773	262,604	333,567	4,370	3,831	2,367		188	57,859	251,830

[a] Buckeye, Jacobsen and Fish Springs were combined under the Buckeye Allotment.
[b] No information available.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1978-1980.

					TEN YEARS							
		FORAGE CONDITION			ECOLOGICAL CONDITION				FORAGE CONDITION			
POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR
					12	2,078	3,358					
					2	96	1,867					
477							655	476				
2,481		3,059	2,286	1,999		209	1,892	2,384		3,156	2,289	1,899
209					49	4,067	7,126	203				
						718	3,561					
					3	154	1,283					
2,111						100	1,038	2,005				
-					-	-	-	-				
						47	617					
5,278		3,059	2,286	1,999	66	7,469	21,397	5,068		3,156	2,289	1,899
20,310			3,386		589	8,153	25,105	18,458		3,386		
9,333			624		105	1,501	3,034	8,513		624		
68,477			2,916		34	2,075	18,854	63,267		2,916		
30,142					289	5,192	6,883	28,375				
8,256		146	2,785		59	1,553	6,983	7,595	15	2,248	668	
8,406			1,087		932	16,790	23,603	7,702		1,087		
1,906			600		77	3,613	19,354	1,717		600		
11,210			600		367	6,134	18,411	10,276		600		
13,232					8	675	5,631	12,408				
3,390					30	1,177	5,417	3,087				
14,385					22	520	2,676	13,175				
15,249			2,100		413	6,914	19,106	14,219		2,100		
204,296		146	14,098		2,925	54,297	155,057	188,792	15	13,561	668	
-						-	-	-				
4,383						13	331	4,383				
15,844						57	669	15,844				
375						440	2,641	375				
-						-	-	-				
442						6	271	441				
777						103	1,988	777				
2,768						54	1,713	2,767				
9,609							2	9,607				
-						-	-	-				
179						29	1,525	179				
14,369						1,261	2,241	14,350				
2,741						44	3,813	2,741				
-						-	-	-				
736						120	2,138	736				
1,981						9	313	1,981				
4,999						463	9,777	4,989				
1,672						38	958	1,672				
-							282	84				
84						-	-	-				
13,456						78	2,249	13,454				
1,536						28	1,175	1,535				
7,334						38	257	7,334				
4,174						10,368	13,210	4,174				
						1,086	3,418					
882						157	2,987	871				
1,638						24	1,253	1,638				
2,409		1,309	616	368		165	1,822	2,409		1,340	585	368
511						83	1,820	511				
5,387						45	876	5,353				
2,951						56	104	2,951				
8,961						2	99	8,961				
-						-	-	-				
-						-	-	-				
3,982						2,077	9,686	3,981				
114,180		1,309	616	368		16,844	67,618	114,098		1,340	585	368
323,754		4,514	17,000	2,367	2,991	78,610	244,072	307,958	15	18,057	3,542	2,267

APPENDIX F, TABLE 1-6
PERCENT CHANGE IN VEGETATION CONDITION
MAXIMIZATION OF LIVESTOCK

ECOLOGICAL CONDITION (in terms of acres)

POOR	FAIR	GOOD	EXCELLENT	
333,567	262,604	50,773		Present
7,257	6,056			Proposed Seedings
326,310	256,548	50,773		Present Minus Seedings
307,958	244,072	78,610	2,991	Future
18,352	12,476	27,837	2,991	Change
3% down	2% down	4% up	1% up	Percent Change
				Total Native Range = 633,631

Results: 5% increase in good and excellent ecological condition.

FORAGE CONDIITON (in terms of acres)

2,367	3,831	4,370		Present
2,267	3,542	4,744	15	Future
100	289	374	15	Change Total Existing Seedings = 10,568
1% down	3% down	4% up	0	Percent Change Plus 13,313 Acres of Proposed Seeding in Good Condition

Results: 4% increase in good forage condition.

Source: U.S. Department of Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1978-1980.

RESOURCE PROTECTION

APPENDIX F, TABLE 1-7
ECOLOGICAL RANGE AND FORAGE CONDITION (ACRES)
RESOURCE PROTECTION ALTERNATIVE

	PRESENT							FIVE YEARS		
	ECOLOGICAL CONDITION			FORAGE CONDITON			TREND	ECOLOGICAL CONDITION		
	GOOD	FAIR	POOR	GOOD	FAIR	POOR		EXCEL.	GOOD	FAIR
CATEGORY M										
Bagley Valley	1,770	3,678					down		1,886	3,562
Barney Riley		1,965					up		34	1,931
Carter Station		654	477				down			654
Hallelujah Junction	49	1,955	2,481	2,957	2,388	1,999	up		131	1,873
Hardscrabble	3,912	7,324	209				static		3,988	7,248
Harvey Flat	704	3,575					static		711	3,568
Haypress		1,440					down		54	1,386
Indian Hills		1,032	2,111				up		51	981
Millberry Canyon[b]	-	-	-				-		-	-
Wade Valley	36	628					up		42	622
SUBTOTAL:	6,471	22,251	5,278	2,957	2,388	1,999			6,897	21,825
CATEGORY I										
Antelope Mountain	2,392	31,225	22,074				static	120	5,112	29,487
Big Canyon	1,231	2,443	10,103				down	7	1,279	2,534
Buckeye[a]	103	16,001	71,042				down	2	325	15,426
Churchill Canyon	4,733	5,859	30,147				down	23	4,797	5,777
Clifton	30	696	15,844				static		93	1,426
Constantia	284	8,661	9,245	104	827		down		588	7,346
Duck Hill		1,766	2,768				static		144	1,761
Flanigan	14,156	26,460	9,498				down	34	14,626	25,961
Gold Hill	1,195	2,288	14,369				up	60	1,315	2,844
Hackett Canyon		3,857	2,741				down		44	3,813
Hungry Valley	271	23,184	1,906				down		898	21,957
Jumbo		10,230	4,999				down		465	9,775
Kings Canyon		996	1,672				down		38	958
Mustang	36	259	7,334				static		50	612
Olinghouse	10,089	13,489	4,174				down		10,369	13,209
Paiute Canyon	3,100	21,250	11,438				down		3,811	20,167
Pinenut	6	5,447	13,269				down		75	5,415
Plumas Station	76	1,911	2,409	1,309	616	368	static	8	251	1,850
Rawe Peak		887	5,387				down		45	876
Shovel Springs	139	6,182	3,390				down		381	5,940
Spanish Springs		101	8,961				static		7	543
Sunrise	138	889	15,366				static	2	269	1,737
White Hills	1,758	10,004	3,982				down		2,079	9,684
Winnemucca Ranch	3,197	22,924	16,631				down		4,311	21,092
SUBTOTAL	42,934	217,009	288,749	1,413	1,443	368		256	51,372	210,190
CATEGORY C										
Black Springs[b]	-	-	-				-		-	-
Carson Plains		344	4,383				down			344
Cottonwood	344	2,737	375				static		344	2,737
Diamond Valley[b]	-	-	-				-		-	-
Double Springs		276	442				static		1	275
Dry Lake		2,091	777				up			2,091
Eldorado			9,609				down			
Faye Canyon[b]	-	-	-				-		-	-
Galena Creek		1,554	179				static			1,554
Hangman[b]	-	-	-				-		-	-
Haskell Peak		2,258	736				static		26	2,232
Indian Creek		322	1,981				down			322
Koch Ditch		282	84				down			282
Luther Creek[b]	-	-	-				-		-	-
Mill Canyon		2,325	13,456				down		11	2,314
Mud Lake		1,202	1,536				down			1,202
Pah Rah	974	3,530					static		974	3,530
Peavine Mountain		3,133	882				static		38	3,095
Peavine Watershed		1,277	1,638				up			1,277
Prison Hill		1,903	511				up			1,903
Sand Canyon	50	110	2,951				down		50	110
Spratt Creek[b]	-	-	-				-		-	-
Wedekind[b]	-	-	-				-		-	-
SUBTOTAL	1,368	23,344	39,540						1,444	23,268
TOTAL	50,773	262,604	333,567	4,370	3,831	2,367		256	59,713	255,283

[a] Buckeye, Jacobsen and Fish Springs were combined under the Buckeye Allotment.
[b] No information available.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1978-1980.

							TEN YEARS					
	FORAGE CONDITION				ECOLOGICAL CONDITION				FORAGE CONDITION			
POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR	EXCEL.	GOOD	FAIR	POOR
					12	2,078	3,358					
					2	96	1,867					
477							655	476				
2,481		3,059	2,286	1,999		209	1,892	2,384		3,156	2,289	1,899
209					49	4,067	7,126	203				
						718	3,561					
					3	154	1,283					
2,111						100	1,038	2,005				
-					-	-	-	-				
						47	617					
5,278		3,059	2,286	1,999	66	7,469	21,397	5,068		3,156	2,289	1,899
20,972					615	8,764	27,258	19,054				
9,957					105	1,501	3,096	9,075				
70,038			1,355		34	2,075	19,010	64,672		1,355		
30,142					289	5,192	6,883	28,375				
15,051					7	258	2,104	14,201				
8,256		146	2,785		59	1,553	6,983	7,595	15	2,248	668	
2,629					11	362	1,759	2,402				
9,493					932	16,790	23,711	8,681				
13,633					190	1,541	3,357	12,764				
2,741					4	463	3,552	2,579				
1,906			600		77	3,613	19,354	1,717		600		
4,989					47	1,834	8,837	4,511				
1,672					4	166	987	1,511				
6,967					2	114	946	6,567				
4,174					550	11,401	11,933	3,868				
11,210			600		367	6,134	18,411	10,276		600		
13,232					8	675	5,631	12,408				
2,287	63	1,308	573	349	32	495	1,794	2,075	192	1,265	522	314
5,353					5	174	1,137	4,958				
3,390					30	1,177	5,417	3,087				
8,512						68	991	8,003				
14,385					22	520	2,676	13,175				
3,981					125	3,222	8,686	3,711				
15,249			2,100		413	6,914	19,106	14,219		2,100		
280,219	63	1,454	8,013	349	3,928	75,006	203,619	259,484	207	8,168	1,190	314
-						-	-	-				
4,383						13	331	4,383				
375						440	2,641	375				
-						-	-	-				
442						6	271	441				
777						103	1,988	777				
9,609							2	9,607				
-						-	-	-				
179						29	1,525	179				
-						-	-	-				
736						120	2,138	736				
1,981						9	313	1,981				
84							282	84				
-						-	-	-				
13,456						78	2,249	13,454				
1,536						28	1,175	1,535				
						1,086	3,418					
882						157	2,987	871				
1,638						24	1,253	1,638				
511						83	1,820	511				
2,951						56	104	2,951				
-						-	-	-				
-						-	-	-				
39,540						2,232	22,497	39,523				
325,037	63	4,513	10,299	2,348	3,994	84,707	247,513	304,075	207	11,324	3,479	2,213

APPENDIX F, TABLE 1-8
PERCENT CHANGE IN VEGETATION CONDITION
RESOURCE PROTECTION

ECOLOGICAL CONDITION (in terms of acres)

POOR	FAIR	GOOD	EXCELLENT	
333,567	262,604	50,773		Present
3,289	3,366			Proposed Seedings
330,278	259,238	50,773		Present Minus Seedings
304,075	247,513	84,707	3,994	Future
26,203	11,752	33,934	3,994	Change
				Total Native Range = 640,289
4% down	2% down	5% up		Percent Change

Results: 6% increase in good and excellent ecological condition.

FORAGE CONDITION (in terms of acres)

2,367	3,831	4,370		Present
2,213	3,479	4,669	207	Future
154	352	299	207	Change
				Total Existing Seedings = 10,568
2% down	3% down	3% up	2% up	Percent Change
				Plus 6655 Acres of Proposed Seeding in Good Condition

Results: 5% increase in good and excellent forage condition.

Source: U.S. Department of the Interior, Bureau of Land Management, Carson City District, SVIM Inventory, 1978-1980.

APPENDIX G

SECTION 1 — METHODOLOGY FOR PREDICTING FUTURE PRODUCTION OF PROPOSED SEEDINGS

SECTION 2 — METHODOLOGY FOR PREDICTING FUTURE AUM PRODUCTION

SECTION 1

Methodology for Predicting Future Production of Proposed Seedings

The methodology for predicting the future production of proposed seedings can be divided into three phases: 1) interpolation of the carrying capacity of existing seedings to proposed seedings; 2) inspection of tentative seeding sites to determine the range sites involved and the potential success of the seedings based upon the potentials of these sites; and 3) application of the carrying capacity values determined for each range site in phase 1 to the acres by range site in each proposed seeding. Discussion of each phase follows:

1) Several thousand acres were seeded with a desirable mixture of grasses, forbs and shrubs in Long Valley in the northwest section of the EIS area. This 8 year old seeding included primarily three range sites, the loamy 10-12" pz, the loamy 8-10" pz, and the juniper savannah 10-12" pz. It was inventoried during the 1978-1980 SVIM Inventory. The acreages were tabulated and carrying capacities summarized on the "Vegetation Inventory Write-up Summary by Allotment" form. Initial stocking rate values in acres per AUM (Ac/AUM) were selected for individual seeded SWAs in fair and good forage condition, and weighted average initial stocking rates determined for fair and good condition for each of the three range sites mentioned (Table 1 of this section).

2) Potential seeding sites were inspected to determine the range sites and the number of acres of these sites which may be treated. Only those sites with the highest potential for a successful seeding were considered.

3) The acres selected as potential seeding areas in phase 2 were divided by the appropriate weighted average fair and good condition initial stocking rate values determined in phase 1 to derive a measure of the potential seeding production at five years and 10 years in the future, respectively. For example, the acres of loamy 8-10" pz range site selected for possible seeding were divided by the fair and good condition weighted average Ac/AUM values determined for the loamy 8-10" pz range site in phase 1; calculations were as follows:

acres of proposed seeding	weighted average Ac/AUM
600 acres (loamy 8-10" pz, 26-16) range site	values for fair and good cond. loamy 8-10" pz, 26-16 range site fair = 9.54 Ac/AUM good = 3.15 Ac/AUM

600 AC divided by 9.54 Ac/AUM = 63 AUMs; possible production 5 years in the future

600 AC divided by 3.15 Ac/AUM = 190 AUMs; possible production 10 years in the future

Weighted average initial stocking rate values (Ac/AUM) used were as follows:

loamy 10-12" pz, 26-10

fair	good
8.86 Ac/AUM	2.97 Ac/AUM

Note: These values were also used for the similar sites granitic fan 10-12" pz, 26-08; and loamy 10-12" pz, 23-20.

loamy 8-10" pz, 26-16

fair	good
9.54 Ac/AUM	3.15 Ac/AUM

Note: These values were also used for the similar sites shallow loam 10-12" pz, 26-15; Sandy 8-10" pz, 26-20; and loamy 8-10" pz, 23-06.

juniper savannah 10-12" pz, 26-17

fair	good
7.61 Ac/AUM	4.38 Ac/AUM

Actual data derived during, 1) the determination of weighted average initial stocking rate values for the 26-10, 26-16, and 26-17 range sites, 2) in the selection of possible seeding sites, and 3) during the calculation of possible future seeding production are available for review at the Carson City District Office.

During the 1980 SVIM Inventory in the Long Valley seeding, forage condition classes were assigned based upon the following general criteria:

1) The plant species composition had to include at least 10 percent seeded species, and the seeded species had to give the vegetative aspect to the Site Write-up Area.

2) Poor forage condition was defined then by a vegetation production range from 150 pounds per acre air dry annual biomass to 275 pounds per acre.

3) Fair forage condition was defined by a production range from 275 to 500 pounds per acre.

4) Good forage condition was defined by a production range greater than 500 pounds per acre.

The above production values defining a particular condition class were tempered by the relative abundance of seeded species present and by professional judgement of the range conservationist responsible for the vegetation type mapping (ie., a site may have had 600 pounds production and only 14 percent seeded species and therefore may have been placed in the fair forage condition class).

If the above criteria were not met in a SWA, its ecological condition was determined by comparing the estimate of its current vegetation composition, production and aspect to the potential climax plant association.

APPENDIX G, SECTION 1, TABLE 1
WEIGHTED AVERAGE INITIAL STOCKING RATE (Ac/AUM) VALUES DERIVED FROM 1978-1980 SVIM INVENTORY OF LONG VALLEY SEEDINGS

Loamy 10-12" pz, 26-10 [a]

fair condition			good condition		
acres	x Ac/AUM	= weighted value	acres	x Ac/AUM	= weighted value
147	7.89	0.67	714	2.47	0.81
18	12.12	0.13	1,029	2.93	1.39
534	9.21	2.86	433	3.85	0.77
27	13.86	0.22	2,176 total acres		2.97 (weighted average Ac/AUM)
994	8.62	4.98			
1,720 total acres		8.86 (weighted average Ac/AUM)			

Loamy 8-10" pz, 26-16 [b]

fair condition			good condition		
acres	x Ac/AUM	= weighted value	acres	x Ac/AUM	= weighted value
55	13.86	2.43	224	4.15	1.80
259	8.62	7.11	292	2.39	1.35
314 total acres		9.54 (weighted average Ac/AUM)	516 total		3.15 (weighted

Juniper Savannah 10-12" pz, 26-17

fair condition			good condition		
acres	x Ac/AUM	= weighted value	acres	x Ac/AUM	= weighted value
427	7.88	2.91	106	6.82	2.03
728	7.45	4.69	250	3.34	2.35
1,155 total acres		7.60 (weighted average Ac/AUM)	356 total acres		4.38 (weighted average Ac/AUM)

---

[a] These values were also used for the 26-08 and 23-20 range sites.

[b] These values were also used for the 26-15 and 26-20 range sites.

SECTION 2

Methodology for Predicting the Future AUM Production for all Allotments in the No Action Alternative and the Category M and C Allotments in all other Alternatives

The potential production of the No Action Alternative and the Category M and C allotments in all other alternatives, expressed in terms of AUMs, was predicted in the following manner:

Step 1) The results of the predicted change in vegetation condition for the No Action alternative were used in predicting the future AUM production for this alternative. Such a form as Figure 1-4 was completed for each allotment as described in Appendix F. In Figure 1-4, column 4, sections A and B summarize the shift in acres by condition class for each range site. Most SCS Range Site Descriptions include initial stocking rate figures (in Ac/AUM) for each ecological condition class. For those range sites lacking these values, necessary values were interpolated from similar range sites, see Table 1 of this section.

Step 2) These initial stocking rate values for each ecological condition class of each range site were applied to the acreage values in the corresponding range site and condition class in Figure 1-4. The following example demonstrates this process.

range site - loamy 10-12" pz, 26-10;
Initial stocking rate values by ecological condition class are:

poor	fair	good	excellent
36.0	12.3	7.4	5.3
Ac/AUM	Ac/AUM	Ac/AUM	Ac/AUM

Acres in each ecological condition class (from EIS 3-1, column 4, section A; Appendix F, Section 1):

poor	fair	good	excellent
2,070	1,379	94	0
divided by	divided by	divided by	divided by
36.0 Ac/AUM =	12.3 Ac/AUM =	7.4 Ac/AUM =	5.3 Ac/AUM =
58 AUMs	112 AUMs	13 AUMs	0 AUMs

Total AUMs for this range site = 183

This procedure was followed in each allotment for the acres listed in the ecological condition category for each range site. Another method of predicting potential AUM production was employed for all Category I allotments as described in Appendix F, Section 1.

Step 3) The seeded acres in the Constantia, Hallelujah Junction, and Plumas Station allotments, which were recorded on such a form as Figure 1-4 as having forage condition (column 4, Section B) were treated in a different manner. In each of these three allotments the total percent improvement or deterioration in ecological condition and forage condition (Appendix F) was used as a guide in determining the potential AUMs associated with the seeded acres. For example, in the Constantia allotment the vegetation condition was predicted as deteriorating 11 percent with the No Action alternative. Therefore, the AUMs currently available from the seeding in the Constantia allotment (determined from the 1980 SVIM Inventory) were reduced 11 percent. Likewise, the AUMs currently available from the seeding in the Hallelujah Junction allotment were increased three percent since the vegetation condition was expected to improve three percent. The AUMs currently available from the seeding in the Plumas Station allotment were not changed since trend and vegetation condition are static. These AUM values were included with the AUMs predicted in step 2 in these three allotments.

Step 4) The AUMs predicted in each allotment were totaled and listed by allotment (available for review at the Carson City District Office). The results were used in the Economic Analysis of all alternatives.

TABLE 2-1
SCS Range Site Correlation for AUM Predictions

Range sites lacking initial stocking rate values: Range Site #	Similar range sites with initial stocking rate values available (these values were used to predict future AUMs possible): Use the Ac/AUM values from Range Site #
22-994	26-17
22-995	23-28
22-997 through 999	trace
23-20	26-10
23-997	26-11
23-998	26-23
23-999	26-29
26-30	23-09
26-38	23-19
26-39	26-23
26-40	23-19
27-979	23-04
27-980	24-02
27-984	24-02
27-988	24-02
27-989	24-17
27-990	24-17
27-991	26-25
27-994	26-25
27-995	26-29
27-996	23-04
27-998	26-15
27-999	26-21

APPENDIX H

METHODOLOGY FOR DETERMINING EXISTING MULE DEER NUMBERS

APPENDIX H

METHODOLOGY FOR DETERMINING EXISTING MULE DEER NUMBERS BY ALLOTMENT

The Nevada Department of Wildlife (NDOW) submitted reasonable numbers by planning unit and allotment and existing numbers by planning unit. The BLM and NDOW agreed to use the following formula to determine existing numbers by allotment:

$$\frac{\text{Reasonable Numbers In Allotment}}{\text{Reasonable Numbers In Planning Unit}} = \frac{\text{Existing Numbers In Allotment}}{\text{Existing Numbers In Planning Unit}}$$

APPENDIX I

VRM CLASSES FOR PUBLIC LANDS

APPENDIX I

VRM CLASSES FOR PUBLIC LANDS

CLASS 1: Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to wilderness areas, wild and scenic rivers, and other similar situations.

CLASS 2: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.

CLASS 3: Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape.

CLASS 4: Any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color, and texture of the characteristic landscape.

CLASS 5: The classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications. The classification also applies to areas where there is potential to increase the landscapes' visual quality. It would, for example, be applied to areas where unacceptable cultural modification has lowered scenic quality; it is often used as an interim classification until objectives of another class can be reached.

APPENDIX J

RECREATION OPPORTUNITY SPECTRUM

APPENDIX J

RECREATION OPPORTUNITY SPECTRUM

While the goal of the recreationist is to obtain satisfying experiences, the goal of the recreation resource manager becomes one of providing the opportunities for obtaining these experiences. By managing the natural resource settings, and the activities which occur within it, the manager is providing the opportunities for recreation experiences to take place. Therefore, for both the manager and the recreationist, recreation opportunities can be expressed in terms of three principal components: the activities, the setting, and the experience.

For management and conceptual convenience possible mixes or combinations of activities, settings, and probable experience opportunities have been arranged along a spectrum, or continuum. This continuum is called the Recreation Opportunity Spectrum (ROS) and is divided into six classes (Figure 1). The six classes, or portions along the continuum, and the accompanying class names have been selected and conventionalized because of their descriptiveness and utility in Land and Resource Management Planning and other management applications.

Each class is defined in terms of its combination of activity, setting, and experience opportunities (Table 1). Subclasses may be established to reflect local or regional conditions as long as aggregations can be made back to the six major classes for regional or national summaries. An example of a subclass may be a further breakdown of Roaded Natural into subclasses based on paved, oiled, or dirt surfaced roads, which in turn reflects amount of use, or a further breakdown of Primitive based upon aircraft or boat use.

The Recreation Opportunity Spectrum provides a framework for defining the types of outdoor recreation opportunities the public might desire, and identifies that portion of the spectrum a given National Forest might be able to provide.

Recreation Opportunity Spectrum

Primitive	Semi-Primitive Non-Motorized	Semi-Primitive Motorized	Roaded Natural	Rural	Urban
Area is characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.	Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted.	Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.	Area is characterized by predominantly natural-appearing environments with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.	Area is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities of intensified motorized use and parking are available.	Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans, on-site, are predominant. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

APPENDIX K

SPECIFIC CRITERIA FOR GROUPING ALLOTMENTS INTO SELECTED MANAGEMENT CATEGORIES

APPENDIX K

SPECIFIC CRITERIA FOR GROUPING ALLOTMENTS INTO SELECTIVE MANAGEMENT CATEGORIES

CATEGORY M: (Maintenance)

1. Present range ecological condition is satisfactory and/or improving.
2. Present management is satisfactory.
3. Allotment is producing at or near its potential for vegetation production.
4. There are no or very limited land use conflicts.
5. Public lands may be widely scattered or their total acreage so small as to make intensive management or improvements economically unsound.
6. Range improvements may have already been completed or are unnecessary.

All or some of the above criteria will be used to determine category M status.

CATEGORY M: (Maintenance)

ALLOTMENT	CRITERIA
Bagley Valley	1. Range ecological condition: Poor-none; Fair 68%; Good 32%; trend up. 2. Present management acceptable. 3. Present production appears to be near potential. 4. There are no wild horses and deer summer use is limited only by area, not vegetation. 5. Public lands are scattered and are mostly on the steeper slopes. 6. Range improvements not needed.
Barney Riley	1. Total allotment acreage of 1965 acres is in fair ecological condition. 2. Present management acceptable. 3. Due to scattered acreage of public lands present management is the only feasible one. 4. Deer use about 50 AUMs and is not in conflict with livestock use. 5. Public lands are very widely scattered. 6. Range improvements are unnecessary and impractical.
Carter Station	1. Carter Station is not in use as a livestock allotment and will be kept for wildlife.
Hallelujah Junction	1. 90% of the allotment is in a 5 species seeding and is in good or better vegetation condition. 2. Present management is good. Allotment production is slightly over 1 acre/AUM. 3. No conflicts. 4. Public lands are the majority of the area. 5. Some additional water could be developed; all other improvements are in.
Hardscrabble	1. Range ecological condition: Poor 2%; Fair 64%; Good 34%; trend up. 2. Present management is acceptable. 3. Production will increase under present system. Utilization is under 50% of key species. 4. No wild horses, deer use is summer only. 5. Public lands are well blocked up. 6. Maintenance of present improvement only.

Haypress	1. Total allotment of 1440 acres is in fair ecological condition. 2. Due to scattered public acreage present management is the only method practical. 3. Present production appears to be near SCS potential. 4. No conflicts. 5. Public lands are very scattered. 6. None needed.
Harvey Flat	1. Range ecological condition: Poor-none; Fair 84%; Good 16%. 2. Management acceptable for scattered public lands. 3. Appears production is near potential. 4. No conflicts. 5. Public lands are scattered. 6. None necessary.
Indian Hills	1. Indian Hills is grazed and managed to enhance deer habitat grazing seasons; numbers of livestock are controlled by wildlife biologists.
Millberry Canyon	1. Allotment contains 1359 acres of scattered lands with only 16 AUMs of livestock use, production is good. 2. Management is satisfactory for the situation.
Wade Valley	1. 664 acres of scattered public lands are all in fair or good ecological condition. 2. Management is satisfactory for present situation.

CATEGORY I: (Improvement)

1. Present range ecological condition is fair to poor; range trend is apparently downward.

2. Present grazing management practices are inadequate to meet long-term resource objectives.

3. Allotment has the potential for medium to high vegetation productivity and has now only low to fair production.

4. Resource conflicts are evident.

5. There is potential for positive economic return on public investments.

6. The permittee or permittees are willing to share in cost and or labor towards improvement in cooperation with the Bureau on public lands.

7. The allotments contain a majority of public lands where intensive management is feasible and can be cost effective.

All or some of the above criteria will be used to determine Category I status.

CATEGORY I: (Improvement)

ALLOTMENT	CRITERIA
Antelope Mountain	1. Range ecological condition: Poor 40%; Fair 56%; Good 4%. 2. Present AMP is being revised. 3. Predicted potential for the allotment is over 10,000 AUMs or 5.25 acres/AUM. 4. Critical winter range for Lassen-Washoe Interstate Deer Herd; high recreation demands due to proximity to Reno Area; small wild horse population; high mineral exploration. 5. Production of forage could be almost doubled with a minimal amount of Range Betterment funds; cost-benefit should be good. 6. This item is unknown at this time as the allotment will not be used by the Lucky Hereford Ranch for a year or two. 7. The allotment contains very little private land, less than 10%.
Big Canyon	1. Range ecological condition: Poor 73%; Fair 18%; Good 9%. 2. Needs AMP. 3. Predicted potential is about 6 acres/AUM. 4. Some conflicts, although small, with summer deer use and spring antelope use. 5. Cost-Benefit Rates should be good, with a minimal amount of range improvements necessary. 6. Cooperators are willing to expend their funds and labor on the allotment. 7. Majority of the allotment is public land.
Buckeye	1. Range ecological condition: Poor 82%; Fair 18%; Good 0%. 2. AMP needed, plus coordinated plan with Indians. 3. Predicted potential for the allotment is 8 acres/AUM or 10,000 plus AUMs. 4. Conflicts with wild horses, deer, livestock, and recreation; subdivisions being constructed on the edge and inside the allotment. 5. No significant range improvements are proposed. Livestock management system only.

6. N/A.
7. The allotment contains some private lands and Indian lands, but federal lands are in large blocks and are easy and economical to manage.

Churchill Canyon

1. Range ecological condition: Poor 74%; Fair 14%; Good 12%.
2. AMP needed.
3. Predicted potential for the allotment is 12 acres/AUM.
4. Conflict with wild horses, deer, and livestock.
5. No significant range improvements are proposed. Livestock management system only.
6. N/A.
7. Majority of allotment is public land.

Constantia

1. Range ecological condition: Poor 48%; Fair 45%; Good 1%; remaining 931 acres are in a seeding which is in fair forage condition.
2. AMP needed.
3. Predicted potential for the allotment is 5 acres/AUM.
4. Conflicts: Deer winter range and livestock.
5. Proposed seeding will be in the same soil type as the Hallelujah Junction seeding, which was very successful, cost-benefit should be good.
6. N/A.
7. Public lands are blocked in large enough parcels to make management sound and economical.

Flanigan

1. Range ecological condition: Poor 19%; Fair 53%; Good 28%.
2. AMP needed.
3. Predicted potential for the allotment is 6 acres/AUM.
4. Conflicts: Deer winter range, wild horses, and livestock.
5. Production of forage can be almost doubled with a small amount of Range Betterment funds. Cost-benefit should be good.
6. The present permittees are good cooperators and are willing to expend both labor and funds on public lands.
7. The allotment contains very little private land.

Paiute Canyon (includes Hungry Valley and Shovel Springs)	1. Range ecological condition: Poor 24%; Fair 71%; Good 5%. 2. AMP needed. 3. Predicted potential for the allotment is 6 acres/AUM. 4. Conflicts: Deer winter range, livestock, and recreation due to expansion of Reno metropolitan area. 5. Cost-benefit rates should be good for range improvements-potential production could more than double present production. 6. Present permittees are very cooperative. 7. Majority of allotment is public land.
Pinenut	1. Range ecological condition: Poor 71%; Fair 29%; Good 0%. 2. AMP needed. 3. Predicted potential for the allotment is 8 acres/AUM. 4. Conflicts: wild horses, deer, and livestock. 5. Production of forage can be perhaps tripled by a proper management system, only minor range improvements are required. 6. The present permittee is very willing to cooperate on a management system. 7. The allotment contains very little private land.
Sunrise	1. Range ecological condition: Poor 94%; Fair 5%; Good 1%. 2. AMP needed. 3. Predicted potential for the allotment is 12 acres/AUM versus approximately 70 acres/AUM at the present. 4. Conflicts: wild horses, deer, and livestock . 5. Production of forage should be increased dramatically with a proper management system. 6. Very limited range improvements. 7. Majority of acreage is public land.
Winnemucca Ranch	1. Range ecological condition: Poor 39%; Fair 54%; Good 7%. 2. AMP needed and requested by permittee. The permittee has also requested a CRMP group. 3. Predicted potential for the allotment is 6 acres/AUM.

4. Conflicts: some critical deer winter range; some antelope, public recreation pressures and livestock.
5. The allotment has an extremely good potential with a good deal of relict species that would improve with a management plan plus range improvements.
6. The permittee has expended a great deal of money plus labor on the public land and is very willing to cooperate.
7. The public land is well blocked and economical management will occur. Private parcels will be included with public in management consideration and range improvements.

CATEGORY C: (Custodial)

1. Present range condition has stabilized.
2. Vegetative production of allotment is low; potential for improved productivity is limited by economic criteria.
3. Resource conflicts are limited or cannot be controlled due to land ownership pattern.
4. There is no present likelihood of positive economic return on public investment.

All or some of the above criteria will be used to determine Category C status.

These criteria have been approved by the State Director 10-1-1981 for the Reno EIS area. The same criteria have been proposed for the Lahontan EIS area. Allotments will only be grouped by category after public input. Priority of I Allotments will be determined by the CRMP process.

CATEGORY C: (Custodial)

ALLOTMENT	CRITERIA
Black Springs	1. Majority of allotment is in fair ecological condition. 2. Widely scattered lands; potential is low and present production is low, but close to potential. 3. No conflicts, except land development. 4. Presently a sheep allotment, not suitable for livestock grazing due to land patterns unless livestock can be herded (used in conjunction with Peavine).
Carson Plains	1. Widely scattered public lands useable only by herded sheep. 2. Low production and potential. 3. N/A. 4. Range improvements uneconomical.
Clifton	1. Majority of allotment is in poor condition, low production and low potential. 2. Present approximate carrying capacity is 35 acres/AUM; while potential is only 31 acres/AUM. 3. N/A. 4. Costs of range improvements would not be economical for results.
Cottonwood	Less than 5% public lands, majority of allotment is a real estate development. Blocked public lands should be incorporated into the White Hills allotment.
Diamond Valley	No public lands remain in the allotment - will be dropped as an allotment.
Double Springs	1. Allotment contains only 5% public lands, which are widely scattered. Management is presently limited by land status. 2. Ecological condition is 62% poor; 38% fair for the 718 acres of the allotment - potential is low.
Dry Lake	* Scattered public lands in a subdivision area. No present grazing; allotment will be dropped from system.
Duck Hill	1. Very scattered land pattern. 2. Low production potential, generally in a non-use status.

	3. N/A. 4. Range improvements uneconomical.
Eldorado	Used for wildlife and wild horse reserves. No licensed grazing of domestic livestock.
Faye Canyon	Reserved - no livestock grazing. *
Galena Creek	Widely scattered public lands to eventually be disposed of.
Gold Hill	Combined with Jumbo Allotment.
Hackett Canyon	1. Primarily a woodland allotment with little or no potential to increase ecological condition without major vegetation-type changes. 2. Non-use is normal for this allotment.
Hangman	Reserved - no livestock grazing. *
Haskell Peak	Reserved - no livestock grazing. *
Indian Creek	1. Widely scattered public lands. 2. Low potential. 3. N/A. 4. Little chance for range improvements or changes in management.
Jumbo	1. Checkerboard lands. 2. Low potential, present management with monitoring required (used with Gold Hill). 3. N/A. 4. Range improvement possibilities very limited.
Kings Canyon	1. Scattered public land, allotment contains 34% public lands. 2. Low potential. 3. N/A. 4. No range improvements needed.
Koch Ditch	Only 300 acres of public land lays within the allotment.
Luther Creek	Reserved - no livestock grazing. *
Mill Canyon	1. Light to non-use by domestic livestock. 2. Low potential production. 3. Some conflicts arising between wild horses and livestock as horse populations are increasing. 4. Range improvements not economical.

Mud Lake	1. Widely scattered public lands. 2. Low potential; changes in management impractical.
Mustang	1. Checkerboard lands. 2. Low potential, mostly annual grass. 3. N/A. 4. Costs to convert to perennial rangeland prohibitive.
Olinghouse	1. Checkerboard lands, management change would require exchange of use. 2. Ecological condition of the allotment is Poor 15%, Fair 49%, Good 36%. Utilization is under 50% of key species. 3. Wild horse conflicts.
Pah Rah	Small percentage of public lands, widely scattered, 205 AUMs has been in a non-use status for several years. Wild horses are becoming a conflict as population increases.
Peavine	Combined with Black Springs.
Peavine Watershed	Not an allotment - grazed only to reduce fire hazard on the Watershed at request of other agencies.
Plumas Station	Scattered lands pending a land exchange. Will continue present management until exchange is complete.
Prison Hill	Reserved - no livestock grazing. *
Rawe Peak	Primarily woodland type, low production potential.
Sand Canyon	Low production, low potential, primarily in a non-use status.
Spanish Springs	See Mustang Allotment; checkerboard lands with some classified for disposal.
Spratt Creek	Reserved - no livestock grazing. *
Wedekind	1. Small allotment with scattered public lands - primarily annual grasses. 2. Low production, low potential.

White Hills	1. Checkerboard lands, need exchange of use for proper management. 2. N/A. 3. Wild horse conflicts. 4. See Olinghouse Allotment, run in common.

* Reserve allotments will be dropped from grazing system. Kept for wildlife and other uses.

APPENDIX L

SECTION 1 — SCOPE OF ANALYSIS

SECTION 2 — IMPACT ANALYSIS

SECTION 3 — LINEAR PROGRAMMING MODELS

SECTION 4 — RANCH BUDGETS

SECTION 5 — METHODOLOGY FOR ECONOMIC ANALYSES OF DEER HUNTING

SECTION 6 — RURAL INCOME ESTIMATE METHODOLOGY

APPENDIX L, SECTION 1

SCOPE OF ECONOMIC ANALYSIS

The ranch economic analysis in this EIS is limited to changes in income, employment and ranch value. No analysis of the present value of the alternatives is included. The long term impacts estimates are for the purposes of comparison only. They are not intended to provide justification for the proposed action or any alternative. Present value analysis will be included as part of the benefit/cost procedures during the allotment management planning process following the EIS when budget justification is appropriate. At that point detailed site-specific projections of grazing levels, range improvements and future conditions will be available.

No analysis of the number of ranchers that would go out of business as a result of the proposed action or alternatives was included. Such an analysis requires detailed information on each individual ranchers' financial condition (Norberg, 1981). Due to time, budget and data collection constraints this information was not available. In addition, it appears unlikely that recommendations that would bankrupt ranchers would come out of the CRMP process.

No analysis of changes in tax revenues was included. The proposed action and alternatives could affect: (1) personal property taxes for ranch equipment; (2) real estate taxes if ranches are converted to subdivisions; (3) grazing fees collected by BLM; (4) livestock inspection fees; and (5) sales tax revenues from indirect and induced impacts. The largest impact could be the change in sales tax. The largest change in total indirect and induced sales would be for the No Action alternative - a loss of about $1 million. The sales tax revenues would drop by $65,000. This represents about one tenth of one percent of 1981 sales tax collections in the six county region (Nevada State Planning Coordinators Office, 1981). This was not considered to be a significant impact.

No analysis of the impacts of range improvement expenditures was included. They are expected to remain at about current levels.

The analysis includes only significant impacts. The criteria used to determine significance are outlined in the National Environmental Policy Act regulations section 1508.27 (Council on Environmental Quality, 1978).

Although sales (gross revenues) are included in the economic impact tables for each alternative, they are not included in the narrative. The narrative is focused on income and employment. These measurements are much more meaningful for regional impact analysis (U.S. Water Resources Council, 1977).

APPENDIX L, SECTION 2

ECONOMIC IMPACT ANALYSIS ASSUMPTIONS

Several assumptions were made to facilitate the impact analysis because the Linear Programming (LP) models used in the analysis are highly simplified with few variables. These assumptions include:

1) In the short run analyses it was assumed that only downward adjustments in public land grazing would be made. Increases were only allowed in the long term because it usually requires several years to build up herd size.

2) Hay purchases would be at least as high for the impact projections as for the current situation. Local ranchers indicated that they were currently buying hay, but initial runs of the LP models indicated that under profit maximization they would not. Therefore, the models were adjusted to force hay purchase. In order to make the impact analyses comparable, hay purchase had to be forced for them as well. It should be noted that this assumption could exaggerate the impact of possible reductions in livestock grazing and should be considered part of a worst case analysis as outlined by CEQ NEPA regulations, section 1502.22.

3) The same assumption applies to hay production except that no increases in hay production could be included for the impact analyses.

4) The impact analysis consists of changing the amount of EIS area public land forage and its associated "tied" private range forage as well as periods-of-use. In response to these changes the models can purchase additional hay, reduce consumption of leased forage, private pasture and range or change herd size. No changes in per-acre production of private lands, calf or lamb crops or weights, or calf-yearling mix were allowed. These assumptions would generally tend to exaggerate the impact of possible reductions in public land grazing and should be considered part of a worst case analysis.

5) The models only allow hay to be fed to cattle. No hay can be sold. Although some ranchers indicated that they sold hay, this was considered a separate operation.

6) Due to the lack of solid data no forage requirements were included for domestic horses. Horse feed requirements are generally a minute portion of total requirements. On many ranches part of the horse use can be considered pleasure riding rather than necessary for livestock production. This assumption would also tend to slightly overestimate the impact of possible forage reductions and should be considered part of a worst case analysis.

7) Forage availability was considered to be the limiting factor to herd size. No other constraints on herd size were included. The LP models project an immediate change in the ranch operations. It is more realistic to expect that the ranchers would gradually adjust herd size or forage sources over time. However, an analysis of gradual change would require additional data and more complex LP analysis. Due to data collection limitations and budget and time constraints such an analysis was not feasible.

8) Forage sources are projected to be available only during the seasons in which they are currently available. However, it was assumed that they could be used interchangeably within those seasons at no extra cost. This may tend to underestimate the impacts of reductions and changes in periods-of-use. For example, when an allotment is projected to be unavailable during the spring the LP models generally use hay as a substitute feed source. Such a change could require additional herding or trucking costs and could reduce calf crops since the cows are usually calving during the spring.

9) The hay production costs used in the LP models are from unpublished ESCS data. They are generally lower than sample hay costs prepared by the University of Nevada, Reno (Myer et al, 1980) at $22 per ton compared to about $35. Those costs were for the Winnemucca area and therefore are not specific to the EIS area. The ESCS hay costs were selected for this study. They indicate greater impacts from changes in public land grazing and are therefore considered part of a worst case analysis.

10) For this analysis the short term is defined as the period after adjustments in livestock grazing but before any significant change in forage production on Category I allotments. It should be noted that adjustments on the various allotments will not occur simultaneously. Livestock use could increase on some allotments before full reductions occur on others. Since these time frames are unknown, for the purposes of this analysis it was assumed that all allotments

would reach their maximum reduction at the same time. This should be considered part of a worst case analysis. The long term is defined as after intensive management has been successful on Category I allotments and herbage production has increased (Appendix G). The analysis is presented for comparison purposes only and should not be interpreted as a prediction of future conditions, particularly given the uncertainty of CRMP recommendations. On Category M and C allotments and for all allotments under the No Action alternative the long term is defined as about ten years from implementation (Appendix G).

11) For all alternatives it was assumed that livestock use would not exceed the carrying capacity of the range. This may tend to overestimate the impact of reductions because it is unlikely that all of the ranchers would adjust their use to carrying capacity. Changes in calf crops or weaning weights could also occur but are not included in the models due to lack of data. In addition, the models do not include all of the options available to the ranchers such as changing their management of privately owned resources.

12) For each alternative, livestock grazing capacity was defined in different terms based on expected management goals and practices for wild horses and mule deer. For Category I allotments, it was assumed that vegetation would be provided for reasonable numbers of mule deer. For the No Action alternative and for Category M and C allotments it was assumed that no vegetation would be allocated for mule deer as at present. Under the Proposed Action and Resource Protection alternatives it was assumed that recommended numbers of wild horses would be provided for, while in the Maximization of Livestock alternative they would be eliminated. For the Proposed Action and Resource Protection alternatives it was assumed that forage in excess of that required to meet reasonable deer numbers, wild horse demand and total livestock preference would be split evenly among these users. For the Maximization of Livestock alternative it would go to livestock.

13) A problem with the use of "typical" ranch categories is that often the forage resources specified in the LP models do not provide the exact feed level required by the average herd size. Generally two methods have been used to resolve this problem. One is to force the LP models to produce the average number of livestock by purchasing additional feed (usually hay) or if the resources in the models could produce more than the average number of livestock, not using excess forage available. The models used in this analysis produce the optimum number of cows from available forage sources even though this optimum is not equal to the average herd size. Discrepancies are the result of limited data on both forage sources and herd sizes. In order to determine if there was a significant difference between the herd size estimates, a grouped T-test was used. The LP model mean herd size was 545 (including sheep at a ratio of 5:1), and the average herd size was 475. With a T value of .39 and 31 degrees of freedom, it was determined that there was no statistically significant difference between the means when the significance level equals .20 (Nie et al, 1975).

14) Periods-of-use were changed only for the analysis of the Resource Protection alternative. Although such changes could also occur under the Proposed Action and Maximization of Livestock alternatives, it is expected that grazing systems developed for these alternatives could accommodate existing periods-of-use. No changes were analyzed for the low dependency ranch since only two of the 11 allotments would be affected. If any adjustments in periods-of-use are proposed in AMPs, they will be analyzed in individual EAs when more site specific information is available.

15) Estimated changes in the value of grazing allotments were based only on changes in AUMs. Many other factors such as changes in periods-of-use and expected future allotment quality could also affect value but were not included due to lack of data.

16) No opportunity costs were included in the LP analysis since they are non-cash. They represent potential returns to the ranchers if they invested labor and capital in an alternative business. They include wages for family labor and interest on ranch investments. According to the standard economic theory of the firm these returns should be similar for most businesses, all other factors being equal. However, most income statements for western livestock ranchers indicate low returns when opportunity costs are included (Godfrey, 1981). Smith and Martin (1972) argued that these low returns are due to the fact that ranches generate not only production but also consumption outputs. Therefore, opportunity costs are included in this EIS only in Chapter 2 for the purpose of comparison. The impact analysis is based on returns above cash costs plus depreciation.

APPENDIX L, SECTION 3

LINEAR PROGRAMMING MODELS

The ranch economic impact analysis in this EIS is based on linear programming (LP) models. These are computer models which are based on a limited number of variables felt to be most important in determining changes in ranch income from various BLM range management alternatives. The number of variables included is limited by various time, budget and data collection constraints.

The complexity of the models was further limited by the fact that the proposed action does not include any specific changes in vegetation allocations or periods-of-use. These will be determined through the CRMP and monitoring processes as outlined in Chapter 1. Therefore, a complex and time consuming analytical process could not be justified since it is not feasible to predict the outcome of the CRMP and monitoring processes.

The estimates presented in this analysis should be considered very rough approximations of possible results of the various alternatives. Actual impacts could vary by as much as 100 percent from these projections. More accurate estimates will be prepared as part of the activity planning process when more specific proposals are available.

The LP models developed for this analysis maximize returns above variable cash costs subject to a series of livestock production functions and resource constraints. The cost and return data are from the budgets in Appendix L, Table 4-1. The production and resource data are in Appendix L, Table 4-2.

The LP models account for the amount of feed available from each feed source during each season of the year. They also reflect the fact that livestock nutritional requirements vary by season. This requires the use of conversion factors since BLM stocking and pricing policies are based on a constant livestock forage consumption rate. There have been several methods proposed for the use of conversion factors in LP models.

Resource Concepts, Inc. (1981) proposed using a constant year-round factor for cows based on a glossary published·in 1964. This method indicates that a cow without a calf has the same nutritional requirements as a cow with a calf. In fact, numerous studies have proven that nutritional requirements increase for cows when they are with calf (Morrison, 1961; Maynard and Loosli, 1969; Rosiere, et al, 1980). Failure to include this variation could result in seriously underestimating the impact of possible adjustments in the critical spring grazing period when nutritional requirements are high because the cows are lactating.

Garoin and Kim (1981) proposed a method called the multiple grazing activities (MGA) approach. It is essentially a refinement of the approach used in this EIS. Instead of using a weighted average conversion factor which includes all livestock classes, they developed a model that uses separate conversion factors and forage pools for each class. Although the method uses resources more efficiently than the weighted average method used in this EIS, it does not necessarily yield more accurate impact estimates, since it assumes a flexibility in ranch operations which may not be present. This could lead to underestimating the impact of changes in pubic land grazing. Their approach assumes that the purpose of the LP analysis is to provide normative solutions (i.e., the most efficient). Although LP is generally a normative tool, when used in grazing EISs it should reflect a positive economic analysis of what ranchers are more likely to do given current management practices (Gee, 1981). Also important is the fact that the MGA approach requires more complex and expensive LP models while producing only slightly different results (less than five percent in Garoin and Kim's study). Therefore, the weighted average method was selected for the analysis in this EIS.

The LP models were constructed with the COPLAN software system. This was originally intended as an easy-to-use aid in ranch management planning (Child and Evans, 1976) but is readily adaptable to public land grazing impact analysis (Mac Pherson, 1977).

Several non-BLM studies of the economic impact of changes in public land grazing in Nevada have recently been completed. They all included LP analysis. Garoin and Kim's study (1981) indicated that the change in income per AUM of public land grazing in Elko County was about $10. Resource Concepts, Inc.'s study (1980) indicated that the change in income per AUM in a region which includes Churchill, Pershing, Lander, Eureka, Mineral and Nye counties ranged from $6 to $8. Lucier's study (1980) indicated that the change in income ranged from $6 to $14 per AUM in Elko County. Torell et al's study (1980) indicated that the change in income ranged from $6 to $15 per AUM in Humboldt County. Although the analytical framework of these studies varied considerably, their results were fairly consistent with each other and with the analysis for this EIS which indicates a range of $6 to $11 per AUM.

APPENDIX L, SECTION 4

RANCH BUDGETS

The budgets used in this analysis (Appendix L, Table 4-1) were developed through the following procedure: (1) data collection from local ranchers, extension agents, and BLM files; (2) preparation of preliminary ranch budgets by the Economics, Statistics and Cooperatives Service (ESCS) of the Department of Agriculture from the data collected locally and from other ESCS data; (3) review of the preliminary budgets by local ranchers and consultants which included mailing copies of the budget to all EIS area ranchers for comments; and (4) preparation of the final budgets using the comments on the preliminary budgets. Thirteen EIS area ranchers as well as the following individuals provided input during this process:

Baughman, Mike: Resource Concepts, Inc.

Gee, Kerry: Economics, Statistics, and Cooperatives Service

Hoffman, Sue: Washoe County Cooperative Extension

Peterson, Wally: Douglas County Cooperative Extension

Torell, Allen: Resource Concepts, Inc.

APPENDIX L, SECTION 4
TABLE 4-1
RANCH BUDGETS

CATTLE

Item	Yearlong	High Dependency	Low Dependency
SALES			
Steer Calves	63,010	$ 32,169	$ 62,746
Heifer Calves	31,498	15,967	34,171
Yearling Steers	17,802	---	8,127
Cull Cows	31,434	10,826	24,453
Total	143,744	58,962	129,497
PRODUCTION COSTS			
Variable Costs			
BLM Reno Grazing Fee	$ 8,089	$ 1,624	$ 389
BLM Other Grazing Fee	1,153	---	386
Forest Service Grazing Fee	---	71	683
Private Grazing Lease	1,840	1,155	2,694
Hay Production	22,100	9,035	18,000
Hay Purchase	3,150	---	7,350
Protein Supplement	4,342	1,149	1,088
Irrigated Pasture	1,128	2,538	12,236
Salt and Mineral Blocks	1,054	340	751
Veterinary and Medicine	1,414	514	831
Hired Trucking	667	522	556
Marketing	2,428	252	903
Fuel & Lubricants	5,683	2,079	7,633
Repairs	3,875	1,391	2,285
Interest on Operating Capital	4,042	1,396	2,997
Hired Labor	20,984	5,489	11,082
Livestock Depreciation	5,403	1,235	1,924
Total Variable Costs	87,352	28,790	71,788
Fixed Costs			
Overhead	4,769	2,328	3,658
Equipment Depreciation	8,858	4,561	6,308
Land Taxes	4,709	1,928	6,052
Other Taxes	514	363	513
Insurance	3,542	1,184	3,012
Total Fixed Costs	22,392	10,364	19,543
Total Costs	109,744	39,154	91,331
Returns	34,000	19,808	38,166

SHEEP

Item	Total Value
SALES	
Lambs	$ 165,339
Ewes	6,686
Wool	34,307
Incentive Payment	17,251
Total	223,583
PRODUCTION COSTS	
Variable Costs	
BLM Reno Area Grazing Fee	$ 4,026
BLM Other Areas Grazing Fee	427
Forest Service Grazing Fee	2,780
Private Grazing Lease	7,936
Irrigated Pasture	2,649
Hay Produced	5,005
Hay Purchase	30,600
Supplements	2,617
Salt and Mineral Blocks	703
Veterinary and Medicine	1,367
Marketing	820
Trucking	2,500
Shearing And Tagging	8,789
Promotion/Organizations	1,094
Predator Control	3,984
Ram Death Loss	1,719
Fuel and Lubricants	2,695
Repairs	4,961
Interest on Operating Capital	7,265
Hired Labor	44,216
Livestock Depreciation	4,922
Total Variable Costs	141,075
Fixed Costs	
Overhead	4,023
Equipment Depreciation	9,960
Land Taxes	7,695
Other Taxes	508
Legal and Accounting	1,376
Insurance	2,695
Total Fixed Costs	26,257
Total Costs	166,386
Returns	57,197

APPENDIX L, SECTION 4

TABLE 4-2

RENO AREA
RANCH LIVESTOCK AND RESOURCE STATISTICS
1979

Livestock Production

Item	Unit	Yearlong Cattle Ranch	High Dependency Cattle Ranch	Low Dependency Cattle Ranch
		Amount	Amount	Amount
Number of Cows	Head	667	252	475
Calf Crop	Percent	74	77	82
Calf Death Loss	Percent	3	4	3
Replacement Rate	Percent	16	15	15
Cows Per Bull	Head	15	22	24
Cow Death Loss	Percent	4	4	2

Resources

Item	Unit	Yearlong Cattle Ranch		High Dependency Cattle Ranch		Low Dependency Cattle Ranch	
		Period	Amount	Period	Amount	Period	Amount
BLM Reno Area	AUMs	YL	4,280	04-16 - 09-30	859	05-01 - 08-31	206
BLM Other Areas	AUMs	10-01 - 03-15	610	---	---	06-16 - 09-30	204
Forest Service	AUMs	---	---	05-15 - 09-30	35	06-16 - 09-30	338
Private Range	Acres	YL	6,700	04-16 - 09-30	7,374	05-01 - 09-30	3,150
Private Pasture	Acres	05-16 - 09-30	120	04-16 - 12-15	234	YL	805
Private Range Leased	AUMs	10-01 - 12-31	68	05-15 - 12-15	150	05-16 - 09-30	263
Private Pasture Leased	AUMs	05-16 - 09-30	200	05-15 - 12-15	94	05-01 - 09-30	254
Hay Produced	Acres	10-01 - 05-15	340	10-01 - 05-15	139	11-01 - 05-15	250
Hay Purchased	Tons	10-01 - 05-15	42	---	---	11-01 - 05-15	98

Livestock Production

Item	Unit	Sheep Ranch
		Amount
Number of Ewes	Head	3906
Docking Rate	Percent	125
Lamb Death Loss	Percent	20
Replacement Rate	Percent	17
Ewe Loss	Percent	7
Fleece Weight	Pounds	9.5
Ewes Per Ram	Head	35

Resources

Item	Unit	Period	Amount
BLM Reno Area	AUMs	YL	2,130
BLM Other Areas	AUMs	01-01 - 09-30	226
Forest Service	AUMs	05-16 - 09-30	1,376
Private Range	Acres	YL	17,010
Private Pasture	Acres	05-16 - 12-31	327
Private Range Leased	AUMs	01-01 - 09-30	1,512
Private Pasture Leased	AUMs	10-01 - 12-31	944
Hay Produced	Acres	10-01 - 05-15	77
Hay Purchased	Tons	10-01 - 05-15	408

APPENDIX L, SECTION 5

METHODOLOGY FOR ECONOMIC ANALYSIS OF DEER HUNTING

Deer hunting related expenditures were estimated by the following equation: A(BCD + E(F/G)(H/F)) = I.

Values:

A = Deer hunting related expenditures (Nevada Division of State Parks, 1980). Based on ratio between California (non resident) and Nevada (resident) expenditures.

B = Total deer hunters in Alpine and Lassen Counties from California Department of Fish and Game (CDFG)(1980a).

C = Days per hunter in California from CDFG (1980b).

D = Percent of public land in Lassen and Alpine Counties.

E = Average deer population on public land allotments in Nevada (Table 1-1).

F = Deer harvest in regions 2, 19 and 29 from NDOW (1980).

G = Deer population in regions 2, 19 and 29 from NDOW (1980).

H = Deer hunter days in regions 2, 19 and 29 from NDOW (1980).

I = Total deer hunting related expenditures on public lands in the Reno EIS.

Regional income derived from deer hunting expenditures was estimated by the following equation: IJ (KL + MNO) = P

Where:

I = Deer hunting expenditures.

J = Earnings multiplier calculated by BLM, Carson City from data in U.S. Water Resources Council (WRC)(1977).

K = Percent of expenditures in services sector (20%) based on assumption that expenditures by nonresidents would be split evenly between trade and services sectors and expenditures by residents would be in the trade sector.

L = Earnings/output ratio for services sector (WRC, 1977).

M = Percent of expenditures in trade sector (80%).

N = Gross trade margin (WRC, 1977).

O = Earnings/output ratio for trade sector (WRC, 1977).

P = Regional income.

Due to lack of data the following assumptions were made to facilitate this analysis:

1. Expenditures for deer hunting in Nevada were based on the average yearlong deer population on public lands. Since there is a significant level of deer migration between the EIS area and other areas many deer harvested in the EIS area have obtained much of their forage requirements in other areas and visa versa. Due to lack of data on the location of forage sources and on the level of harvest on EIS area public lands it was assumed that expenditures in Nevada could be based on the AUM demand for existing deer numbers as specified in Table 1-1.
2. Even less data were available for the California portions of the EIS area. Therefore it was assumed that expenditures were based on the number of hunters in Alpine and Lassen Counties on public lands. This in turn was based on the percent of public lands in those counties, assuming equal distribution.
3. It was assumed that all expenditures occurred in the EIS region. This probably overestimated expenditures since many of the California hunters probably spent money outside of the region.
4. It was assumed that changes in expenditures resulted in changes in regional income on a one to one ratio. In other words an increase in deer hunting in the region would cause hunters to shift their hunting expenditures from other areas to the EIS region rather than causing them to shift their expenditures to deer hunting from some other form of recreation within the region. This probably overestimates the effect of changes in hunting expenditures since it is unlikely that all expenditure change would translate directly to final demand changes.

APPENDIX L, SECTION 6

RURAL INCOME ESTIMATE METHODOLOGY

Rural area income was estimated with the following equation: TI-CCI-DSI-(RSP)(WI)=RI

Where:

TI = Total Regional Income

CCI = Carson City Income

DSI = Douglas County Services Sector Income (gaming at Lake Tahoe)

RSP = Percentage of Washoe County population in Reno and Sparks townships (98%)

WI = Washoe Income

RI = Rural Area Income

APPENDIX M

SECTION 1 — SOCIAL

SECTION 2 — METHODOLOGY FOR SOCIAL ANALYSIS

APPENDIX M, SECTION 1

SOCIAL ANALYSIS THRESHOLD

The threshold of social values is established for analytical purposes as the status quo, or existing ideologies which is described briefly in Chapter 2 of this document, and more extensively in the Sociological section of the Reno Planning Area Analysis. Predictions of potential social impacts of the management alternatives demonstrate that a wide spectrum of competing social values and resource claims exist. Management decisions will seldom, if ever, conform to all standards of priority and significance.

The distinguishing components of life styles were the determinants for individual and family social impact significance. Any alteration in the social conditions of an individual and the family was considered significant. On secondary group levels, community, regional, state and national, significant impacts were indicated if one or more groups (or their spokespersons) stated that a particular alternative would measuredly change their social well-being.

For all levels of analysis, the evaluation categories included: values placed on the natural resources and use of these resources, viability and stability of organizations (including family) and institutions, continuity of these values and personal and group improvements of lifestyle (BT Associates Study, *Social Assessment Manual*, 1977, methodology used in the Paradise-Denio Grazing EIS, 1981).

APPENDIX M, SECTION 2

METHODOLOGY FOR SOCIAL ANALYSIS

This study follows the methodological examples of the Sonoma-Gerlach amd Paradise-Denio Environmental Impact Statements. The social environment was categorized into three subtypes: the livestock community, the regional area (local residents and interests) and state and national interests (larger conservation and protection organizations).

The Reno EIS area is extremely complex due to the high concentration of population in the urban center. The effects of this urban sprawl reach well into the rural areas and make a rigid rural-urban delineation impossible. In fact, some individuals live on ranches in a rural (or semi-rural) atmosphere and work in the city center. Others live and work in the urban setting, and retreat to the country ranch on the weekend. The full spectrum is represented, for there are also individuals committed to both living and working either in the urban center or attaching themselves to the rural lifeway.

Thirty-eight interviews were conducted with permittees, interest groups and state agencies in the summer of 1981 in order to assess the social impacts that might result from the BLM's proposed action and alternatives. In addition to these personal interviews, newspaper articles and editorials, public participation records, letters and telephone calls from the public, published literature and unpublished documents were used to supplement this information.

Interviews were conducted with 10 (approximately 30 percent) of the Reno area permittees. No attempt was made to conduct a stratified random sampling procedure. Rather, an attempt was made to sample opinions from those permittees who either had the larger livestock operations (some have an extremely small amount of use on public lands) or were regarded as informal spokesmen for the ranching lifestyle. A 50 percent sample was attempted, but due to both timeframes and appointments not being kept, this was impossible.

Interviews which provided the information for regional, state and national social analysis were conducted with representatives of Wild Horse Organized Assistance (WHOA), the International Society for the Protection of Mustangs and Burros (ISPMB), Animal Protection Institute of America (API), American Horse Protection Association (AHPA), The Wildlife Society, Sierra Club, Wilderness Society, Nevada Wilderness Association, the Nevada Outdoor Recreation Association and the Nevada Archaeological Association.

State agency representatives interviewed included the Nevada Department of Wildlife; the State of Nevada Department of Agriculture; faculty from the Department of Agriculture, Renewable Natural Resources at University of Nevada, Reno; members of the Legislative Council Bureau, Research Division; the Nevada State Museum and Nevada State Library.

It must be emphasized that the results of the sociological analysis do not represent unanimity but rather a consensus of opinion. Time and funding constraints prevented a more thorough research. The responses received, however, were fairly predictable in light of the human and behavioral complexity of the rural-urban dichotomy within the EIS area. Therefore, it is contended that the responses obtained were truly representative.

The interviews were neither formal nor structured because of Office of Management and Budget (OMB) restrictions on formal questionaires. The interviews were in more of a conversational mode, triggered by a list of key subjects relevant to each person interviewed. Notes were taken and later analyzed to determine the recurrent significant statements from the informants.

GLOSSARY

GLOSSARY

ALLOTMENT: An area designated for the use of a prescribed number and kind of livestock.

ALLOTMENT MANAGEMENT PLAN (AMP): A documented program which applies to livestock operations on the public lands and is prepared in consultation with the permittee(s) or lessee(s) involved.

AMERICAN KESTREL OR KESTREL: Sparrow Hawk.

CARRYING CAPACITY: The maximum stocking rate possible without inducing damage to vegetation or related resources.

CLIMAX: The highest and most stable of ecological development of a biotic community capable of perpetuation under the prevailing climatic and soil conditions, when undisturbed by outside forces.

CONTIGUOUS: Lands or legal subdivisions having a common boundary; lands having only a common corner are not contiguous.

COORDINATED RESOURCE MANAGEMENT AND PLANNING (CRMP): The current approach taken by the Bureau to include public users, interest groups, agencies and affected individuals in the decision making process before on-the-ground implementation of an activity plan.

DE FACTO: In reality or fact; actually.

EARLY SERAL CONDITION: Synonymous with poor ecological condition.

ECOLOGICAL CONDITION: The present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site.

EVAPOTRANSPIRATION: The combined loss of water from a given area, and during a specified period of time, by evaporation from the soil surface and by transpiration from plants.

FORAGE CONDITION: The present state of health of a range based upon the relative abundance of preferred and desireable plant species present and the total annual herbage it is capable of producing for different classes of livestock and/or wild horses under multiple-use management. Contrasting forage condition with ecological condition: forage condition compares the present abundance and mix of palatable forage plant species available for livestock to the best production and combination of forage species a range can produce for livestock and/or wild horse grazing. Ecological condition is a comparison of the present plant species composition and production to the climax plant community, with no regard to the individual plant species palatability.

FORB: Any herbaceous plant other than a grass, especially one growing in a field or meadow.

GRAZING PREFERENCE: The total number of animal unit months (AUMs) of livestock apportioned and attached to base property owned or controlled by a permittee or lessee for grazing on public lands. Total preference consists of suspended non use AUMs unavailable for licensing and active preference AUMs which can be licensed.

HERBIVORE: An animal which feeds on plants.

INFILTRATION: The downward entry of water into the soil.

INTERCEPTION: The process and amount of rain or snow stored on leaves and branches and eventually evaporated back to the air. Interception equals the precipitation on the vegetation minus *stem flow* and *through fall*.

INTERIM MANAGEMENT POLICY (IMP): The policy which will guide management of public lands during the wilderness review process.

LATE SERAL CONDITION: Synonymous with good ecological condition.

MAJOR LAND RESOURCE AREA: Large geographic area of land characterized by particular patterns of soil, climate, climax plant associations, water resources and land use.

MID SERAL CONDITION: Synonymous with fair ecological condition.

NATURAL PLANT COMMUNITY: The total plant community that is best adapted to a particular site. The community which is in dynamic equilibrium with the environment and expresses the potential of the site.

NON-USE: (Regular) An authorization to refrain, temporarily, from placing livestock on public land without loss of grazing preference for future considerations. (Suspended) Non-use required by BLM due to inadequate vegetation to meet grazing preference.

PERENNIAL STREAMS: Streams which flow all year.

PZ (Precipitation Zone): Relates to the amount of annual precipitation received in a given area.

RAIN SHADOW EFFECT: The region of diminished rainfall on the lee side of a mountain range, where the rainfall is noticeably less than on the windward side.

RANGE CONDITION: The present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. It is basically an ecological rating of the plant community.

RAPTOR: A bird of prey.

RARE II: A comprehensive process, instituted in June 1977, to identify roadless and undeveloped land areas in the National Forest System and to determine their general uses for both wilderness and other resource management and development.

RELICT: An organism or species of an earlier time surviving in an environment that has undergone considerable change.

RELICT SITE (synonymous with comparison area): An area containing a remnant natural plant community, absent of abnormal disturbances and physical site deterioration.

RESOURCE MANAGEMENT PLAN (RMP): The basic document used by BLM to plan the course of management for use and protection of all public land values, renewable resources and supporting services in a given area.

RIPARIAN AREA: A biological zone influenced by the presence of water. Also used to refer to vegetation that grows along streams or around springs.

RIS: The Recreation Inventory System is an inventory method designed to evaluate the quality of specific recreation activities such as fishing, rockhounding and hunting.

ROS: Recreation Opportunity Spectrum. The ROS classifies land areas into six broad types of recreation opportunity. The six classes range from primitive which identifies a natural, unmodified environment to urban, a highly developed or modified environment. The classifications are based on the physical setting and a variety of behavior information intended to recognize that people differ in their needs and in the experiences they desire, and the land differs in its capabilities to provide recreation opportunities.

SECTION 4 PERMIT: Range improvements approved by the BLM, but owned and maintained by the grazing permittee.

SEDIMENT YIELD: The total sediment outflow from a drainage basin in a specific period of time. It includes bed load as well as suspended load, and usually is expressed in terms of mass, or volume per unit of time.

SITE WRITEUP AREA (SWA): The smallest delineated geographical unit to be used as a base for collecting vegetation data is the SWA. It may consist of an entire ecological unit (range site, woodland site or forest type) or a portion of a unit if more than one seral stage (condition class) or present vegetation community exists. It may contain more than one present and/or potential plant community where soil-vegetation complexes occur and are intermingled to the extent they cannot be individually delineated.

STOCKING RATE: The area of land that is allotted to each animal unit for the entire grazable period of the year. Generally expressed as acres/animal unit month (AUM).

TRANSECTS: Sample line from which periodic sample studies are collected (i.e., vegetation condition).

TWINNING: The birth of twin lambs to one ewe.

UNDERSTORY: Plants growing beneath the canopy of other plants. Usually refers to grasses, forbs, and low shrubs under a tree or brush canopy.

UTILIZATION LEVEL: The proportion (percentage) of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. Syn., *degree of use*.

VEGETATION RETROGRESSION: The process whereby the same area becomes successively occupied by different plant communities of lower ecological order.

VISITOR DAY: Any combination of recreational activity, on site, totalling 12 hours (e.g. one person for 12 hours or 12 people for one hour).

VISUAL RESOURCE MANAGEMENT (VRM): The VRM system is an analytical process that identifies, sets, and meets objectives for maintaining visual quality. The system is based on research that has identified ways to assess aesthetic qualities of the landscape and public concern for these qualities. The basic idea is that areas of high quality and public concern should receive a higher level of protection than common landscapes.

WATERSPREADING: A process involving dikes or other such structures to distribute surface water runoff to increase the area of infiltration.

ACRONYMS

AC - Acres
AMP - Allotment Management Plan.
AUM - Animal Unit Month
BLM - Bureau of Land Management
CRMP - Coordinated Resource Management Planning
EIS - Environmental Impact Statement
HUA - Horse Use Area
MFP - Management Framework Plan
NDOW - Nevada Department of Wildlife
ORV - Off-Road Vehicle
RIS - Recreation Inventory System
ROS - Recreation Opportunity Spectrum
TDS - Total Dissolved Solids
URA - Unit Resource Analysis
USGS - U.S. Geological Survey
VRM - Visual Resource Management

BIBLIOGRAPHY

BIBLIOGRAPHY

Behnke, Robert J. and Raleigh, Robert F. "Grazing and the Riparian Zone: Impact and Management Perspectives", in *Strategies for Protection and Management of Floodplain Wetlands and Other Riparian Ecosystems, Proceeding of the Symposium*, U.S.D.A., Forest Service, GTR-WO-l2 (1978).

Blaisdell, James P. and Pechanec, Joseph F. "Effects of Herbage Removal at Various Dates on Vigor of Bluebunch Wheatgrass and Arrowleaf Balsamroot", *Ecology*, Vol. 30 (3) (1949): 298-305.

Boyd, Lee "The Mare - Foal Demography of Feral Horses in Wyoming's Red Desert" - *Symposium on the Ecology and Behavior of Wild and Feral Equids*. University of Wyoming, Laramie, Wyoming, 1979.

Boyd, Lee and Miller, Richard "Work in the Wyoming Red Desert Area" - *Symposium on the Ecology and Behavior of Wild and Feral Equids*. University of Wyoming, Laramie, Wyoming, September 6-8, 1979.

Briemyer, Harold F., Tucker, J., Carmen, H.F., Fenwick, R.S. and Woods, W.F. "How Federal Income Tax Rules Affect Ownership and Control of Farming", North Central Regional Extension Service, University of Illinois at Urbana-Champaign, July 1974.

Britton, C.M., Sneva, F.A. and Clark, R.G. "Effects of Harvest Date on Five Bunchgrasses of Eastern Oregon", *Research in Rangeland Management*, 1979 Progress Report, Oregon State University, Corvallis, Agricultural Experiment Station Special Report 549, 1979.

Child, R.D. and Evans, G.R. "COPLAN: Computer Optimization Planning System", Range Science Dept., Colorado State University, Fort Collins, Colorado, Feb. 1976.

Clements, F.E. "Dynamics of Vegetation: Selections from the Writings of Frederick E. Clements", Edited by B.W. Allred and E.S. Clements, New York: H.W. Wilson Co., 1949.

Coles, F.H. "The Effects of Big Game and Cattle Grazing on Aspen Regeneration", Brigham Young University, M.S. Thesis, 1965 (mimeographed).

Cook, C. Wayne "Effects of Season and Intensity of Use on Desert Vegetation", Utah Agricultural Experiment Station, Bulletin 483 (1971): 57.

Council on Environmental Quality, Executive Office of the President "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" Washington, D.C., 1978.

Cook, C. Wayne and Stoddart, L.A. "The Effect of Intensity and Season of Use on the Vigor of Desert Range Plants", *Journal of Range Management*, Vol. 16(6) (1963): 315-317.

Cook, C. Wayne and Child, Dennis R. "Recovery of Desert Plants in Various States of Vigor", *Journal of Range Management*, 24(5) (1971): 339-343.

Dahlem, Eugene A. "The Mahogany Creek Watershed With and Without Grazing", *Proceedings of the Forum - Grazing and Riparian/Stream Ecosystems*, edited by Oliver B. Cope, Trout Unlimited, Inc., Denver, Colorado, March 1979.

Delany, Dan, BLM Wildlife Biologist, Carson City District Office, (Personal Communication) Carson City, Nevada, 1981.

Dobie, J.F. *The Mustangs*, Little, Brown and Co., Boston, 376 p. 1952.

Duff, Donald A. "Riparian Habitat Recovery on Big Creek, Rich Country, Utah - A Summary of 8 Years of Study", *Proceedings of the Forum - Grazing and Riparian/Stream Ecosystems*, edited by Oliver B. Cope, Trout Unlimited, Inc., Denver, Colorado, March 1979.

Eckert, Dick (Personal Communication) University of Nevada, Reno 1981.

Ensminger, M.E. "Beef Cattle Science" Danville, Illinois: *The Interstate*, 1968.

Ensminger, M.E. *Horse Husbandry*, Interstate Printers and Publishers, Danville, Illinois, 336 p. 1951.

Evans, Borton, Hintz, Van Vleck *The Horse*, W.H. Freemand and Co., 1977.

Garoin, Lee and Kim, Chong S. "A General Procedure for Incorporating BLM and FS Grazing Activities in Linear Programming Models", Division of Agricultural and Resource Economics, University of Nevada, Reno, May 1981.

Gee, C. Kerry "Estimating Economic Impacts of Adjustments in Grazing on Federal Lands and Estimating Federal Rangeland Forage Values", Colorado State University Experiment Station, Fort Collins, Colorado, November, 1981.

Godfrey, E. Bruce, "Measuring the Economic Impact of Agency Programs on Users and Local Communities", (unpublished) Paper prepared for Workshop on Applying Socio-Economic Techniques to Range Management Decision Making, National Academy of Science, Boise, Idaho, May 1981.

Hanley, Thomas A. "Application of an Herbivore - Plant Model to Rest - Rotation Grazing Management on Shrub-Steppe Rangeland", *Journal of Range Management*, Vol. 32 (2) (1979): 115-118.

Herbel, Carlton H. "A Review of Research Related to Development of Grazing Systems on Native Ranges of the Western U.S.", Plant Science Resource, Division of Agriculture Research Service, USDA - Intermountain Shrub Region, 1971.

Herbel, C. and Nelson, "Grazing Management on Semi-Desert Ranges", USDA, Government Printing Office, 1969.

Hess, Michael, NDOW Wildlife Biologist, (Personal Communication), Reno, Nevada, 1977.

Holechek, Jerry L. "Livestock Grazing Impacts on Public Lands: A Viewpoint", *Journal of Range Management*, Vol. 34 (3), May 1981.

Holmgren, Ralph C. and Hutchings, Selar S. (See U.S. Dept. of Agriculture).

Hormay, August L. (See U.S. Dept. of Interior).

Houston, Walter R. and Woodward, R.R. "Effects of Stocking Rates on Range Vegetation and Beef Cattle Production in Northern Great Plains", USDA Technical Bulletin 1357, 1966.

Jeffress, Jim, NDOW Wildlife Biologist (Personal Communication), Reno, Nevada, 1980.

Keeper, Ronald R. "Population Dynamics of Feral Ponies" - *Symposium on the Ecology and Behavior of Wild and Feral Equids*, University of Wyoming, Laramie, Wyoming, 1979.

Klingel, Hans "Reproduction in Plains (African) Zebras", *Reproduction Manual*, 1969.

Laycock, W.A. "Improve your Range by Heavy Fall Grazing", *National Wool Grower*, Vol. 51 (6) (1961): 16,30.

Leithead, H.L. "Grass Management Pays Big Dividends", *Journal of Range Management*, Vol. 13 (1960): 206-210.

Lucier, Gary S. "The Economic Impacts of Introducing Sheep to Range Cattle Operations in Northern Nevada", M.S. Thesis, Div. of Agricultural and Resource Economics, University of Nevada, Reno, 1980.

MacPherson, Scott E. "A Systems Approach to Conflict Analysis of Federal Grazing Use Policies", M.S. Thesis, Range Science Dept. Colorado State University, Fort Collins, Colorado, August 1977.

Martin, S. Clark "Grazing Systems - What Can They Accomplish?" *Rangeman's Journal*, 5(1), February, 1978.

Maynard, L.A. and Loosli. *Animal Nutrition*, McGraw-Hill, N.Y., 1969.

Meehan, W.R. and Platts, W.S. "Livestock Grazing and the Aquatic Environment", *Journal of Soil and Water Conservation*, 33 (1978): 274-278.

Miller, Richard, "Band Organization and Stability in Red Desert Feral Horses" *Symposium on the Ecology and Behavior of Wild and Feral Equids*, University of Wyoming, Laramie, Wyoming, 1979.

Mitchell, Burke and Garrett, James R. "Characteristics of the Range Cattle Industry, 1972 - Region III Northeastern

Nevada", Reno, Nevada: University of Nevada, *Reno Bulletin B 42*, April 1977.

Mollini, William, NDOW Habitat Specialist (Personal Communication) Reno, Nevada, 1981.

Morrison, Frank B. *Feeds and Feeding*, Morrison Pub., Claremont, Canada, 1961.

Mueggler, W.F. "Effects of Spring and Fall Grazing by Sheep on Vegetation of the Upper Snake River Plains", *Journal of Range Management*, 3 (1950): 308-315.

Myer, Gordan et al. "Costs and Returns for Cow-Calf Enterprise with BLM Summer Grazing in Humboldt County, Nevada", College of Agriculture, University of Nevada, Reno, Nevada, 1980.

Nevada Crop and Livestock Reporting Service "1979 Nevada Agricultural Statistics", Reno, Nevada, 1980.

Nevada Employment Security Dept. *Economic Update*, Carson City, Nevada, April 1981.

Nevada Range Studies Task Groups "Nevada Range Monitoring Procedures", 1981.

Nevada State, Legislative Commission of the Legislative Council Bureau, *Access to Public Lands*, Bulletin No. 80-11, 1980.

Nevada State Parks, "Recreation in Nevada, Statewide Comprehensive Outdoor Recreation Plan (SCORP)", Update, 1977.

Nevada State Planning Coordinators Office "Nevada Population Figures by County", Carson City, Nevada, 1980.

Nevada State Planning Coordinators Office "Nevada Statistical Abstract 1981", Carson City, Nevada, 1981.

Nie, Norman H. et al. *Statistical Package for the Social Sciences*, New York: McGraw Hill, 1975.

Nielson, Darwin B. and Workman, J.P. "The Importance of Renewable Grazing Resources on Federal Lands in the Eleven Western States", Utah Agricultural Experiment Station, Logan, Utah, 1971.

Nordberg, Lynn, Federal Land Bank, (Personal Communication) Reno, Nevada, May 27, 1981.

Oakleaf, Robert J. "Population Surveys, Species Distribution, and Key Habitats of Selected Nongame Species", Reno, Nevada: Dept. of Fish and Game, September 1975.

Pearson, L.C. "Effects of Harvest Date on Recovery of Range Grasses and Shrubs", *Agronomy Journal*, Vol. 56(1) (1964): 80-82.

Pendleton, Lori, "Cultural Resources Class I Overview", Nevada, 1981.

Platts, William S. "Livestock Grazing and Riparian/Stream Ecosystems - An Overview", *Proceedings of the Forum - Grazing and Riparian/Stream Ecosystems*, edited by Oliver B. Cope, Trout Unlimited, Inc., Denver, Colorado, March 1979.

Resource Concepts, Inc. "Caliente Grazing Assistance and Evaluation Program", Carson City, Nevada, 1981.

Resource Concepts, Inc. "Potential Impacts of MX Deployment on Ranch Management and Ranch Economics: Draft Final", Carson City, Nevada, 1980.

Rosiere, R.E., Wallace, J.D. and Pieper, R.D. "Forage Intake in Two Year Old Cows and Heifers Grazing Blue Gramma Summer Range", *Journal of Range Management*, Jan. 1980.

Schenbeck, Gregory L. and Dohlem, Eugene A. "Proposed Management of Aspen Habitat in Northern Nevada", *Cal Neva Wildlife Transactions*, edited by James D. Yoakum, Davis, California: The Wildlife Society (1977): 68-74.

Shiflet, Thomas N. and Heady, Harold F. "Specialized Grazing Systems - Their Place in Range Management", USDA, Soil Conservation Service, SCS-TP-152, 1971.

Soils URA (See U.S. Dept. of Interior, Unit Resource Analyses)

State of Nevada, *Water Planning Report*, 1971.

Stoddart, Laurence A., Smith, Arthur, and Box, Thadis, *Range Management*, McGraw-Hill, Inc., 1975.

Stoddart, Laurence A., and Smith, Arthur D. *Range Management*, McGraw-Hill Book Co., 1955.

Storch, Robert L. "Livestock/Streamside Management Programs in Eastern Oregon", *Proceedings of the Forum - Grazing and Riparian/Stream Ecosystems*, edited by Oliver B. Cope, Trout Unlimited, Inc. Denver, Colorado, March 1979.

Thomas, J.W. "Wildlife Habitats in Managed Forest - The Blue Mountains of Oregon and Washington" USDA, Forest Service Agricultural Handbook, No. 553, 1979.

Torell, Allen et al "Economic Impact of BLM Grazing Allotment Reductions on Humboldt County", Division of Agricultural and Resource Economics, University of Nevada, Reno, 1980.

Trlica, M.J., Burvai, M. and Menke, J.W. "Effects of Rest Following Defoliations on the Recovery of Several Range Species", *Journal of Range Management*, Vol. 30 (1) (1977): 21-27.

Trlica, M.J., Jr. and Cook, C. Wayne. "Defoliation Effects on Carbohydrate Reserves of Desert Species", *Journal of Range Management*, Vol. 24 (6) (1971): 418-425.

Tueller, Paul T. Professor of Range Ecology, University of Nevada, (Personal Communication) Reno, Nevada, 1979.

Tueller, Paul T. "Secondary Succession Disclimax and Range Condition Standards in Desert Shrub Vegetation", *Arid Shrub-Lands Proceeding of the Third Workshop of the U.S.-Australia Rangelands Panel*, Tucson, Arizona, March, 1973.

U.S. Dept. of Agriculture, Forest Service "Salt Desert Shrub Response to Grazing Use" by Ralph Halmgren and Selar S. Hutchings, *Wildland Shrubs - Their Biology and Utilization*, edited by C.M. McKell, J.P. Blaisdill and J.R. Goodin, Ogden, Utah: USDA FS General Technical Report INT-1, August 1972.

U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service "Farm Release: Market Developments", Washington D.C. 1980

U.S. Dept. of Agriculture, Forest Service "Management Alternatives for the Riparian Habitat in the Southwest" by Gary A. Davis, *Importance, Preservation and Management of Riparian Habitat: A Symposium*, Tuscon, Arizona. Forest Service General Technical Report RM-43, 1977.

U.S. Dept. of Agriculture, Soil Conservation Service, Special Projects Div. Golden Colorado "Erosion, Sediment, and Related Salt Problems and Treatment Opportunities" (1975): Present Sediment Yield Rates Map, 1974.

U.S. Dept. of Agriculture, Soil Conservation Service (In cooperation with University of Nevada and University of California Agricultural Experiment Stations) "Soil Survey of Carson Valley Area, Nevada - California", July 1971.

U.S. Dept. of Agriculture, Soil Conservation Service and Forest Service (In cooperation with Nevada Agricultural Experimental Station, BLM and BIA), "Soil Survey of the Carson City Area, Nevada", August 1979.

U.S. Dept. of Agriculture, Soil Conservation Service and Forest Service (In cooperation with Univ. of California Agricultural Experiment Station) "Soil Survey of Sierra Valley Area, California, Parts of Sierra, Plumas and Lassen Counties", October 1975.

U.S. Dept. of Commerce, Bureau of the Census "Preliminary Report, 1978 Census of Agriculture: Nevada", Washington D.C., 1980.

U.S. Dept. of Commerce, Bureau of the Census "Advance Report, 1980 Census of Population and Housing: Nevada", Washington D.C., 1981.

U.S. Dept. of Commerce, Bureau of Economic Analysis "Regional Economics Information System", Washington D.C., 1981.

U.S. Dept. of the Interior, Bureau of Land Management and U.S. Dept. of Agriculture, Forest Service "Principles of Rest Rotation Grazing and Multiple-Use Land Management", August L. Hormay, Washington D.C.: Government Printing Office, 1970.

U.S. Dept. of the Interior, Bureau of Land Management, *Management Framework Plan Step 2*, Carson City District, 1980.

U.S. Dept. of the Interior, Bureau of Land Management, *Habitat Inventory: Bird List*, Carson City District, 1978-79.

U.S. Dept. of the Interior, Bureau of Land Management, *Habitat Inventory*, Carson City District, 1980.

U.S. Dept. of the Interior, Bureau of Land Management, *Unit Resource Analyses, Step 2*, Carson City District, 1980.

U.S. Dept. of the Interior, Bureau of Land Management, *Water Resource Inventory*, Carson City District, 1979.

U.S. Dept. of the Interior and U.S. Dept. of Agriculture "Technical Note: Wild, Free-Roaming Horses - Status of Present Knowledge", March, 1975.

U.S. Dept. of the Interior, Bureau of Land Management *Water Resource Inventory*, Carson City District, 1979.

U.S. Dept. of the Interior, Bureau of Land Management Manual, "Technical Supplement 6601-3, Sage Grouse" Rel. 6-23, 1970.

U.S. Water Resources Council "Guideline 5: Regional Multipliers", Washington D.C., 1977.

Van Poollen, H. Walt and Lacey, John R. "Herbage Response to Grazing Systems and Stocking Intensities", *Journal of Range Management*, Vol. 32(4) (1979): 250-253.

Wallace, J.D. and Forester, Larry "Drought and Range Cattle Performance", *Ranchman's Journal*, Vol. 2(6) (1975): 178-180.

Watershed URA (See U.S. Dept. of the Interior, Unit Resource Analyses.)

Winegar, Harold "Camp Creek: Rebirth of a Section", *Oregon Wildlife*, Vol. 30, No. 11 (1975): 6-7.

Yoakum, James, BLM Wildlife Biologist Renewable Resources Division, (Personal Communication), University of Nevada.

INDEX

INDEX

Air Quality 1-15, 3-1

Allotment Management Plans (AMPs) 1-2, 1-3, 1-4, 1-11, 1-15, 3-1, 3-3, 3-4, 3-5, 3-14, 3-15, 3-16, 3-19, 3-20

Animal Unit Months (AUMs) v, xi, xii, 1-2, 1-3, 1-4, 1-5, 1-8, 1-12, 1-13, 2-16, 2-17, 2-19, 2-20, 2-21, 3-3, 3-5, 3-8, 3-12, 3-14, 3-15, 3-16, 3-17, 3-18, 3-20, 3-22, 3-24

Acquatic Habitat (See Riparian) 1-15

Areas of Critical Environmental Concern (ACECs) 1-15, 3-1

Aspen x, 2-6, 2-9, 2-13, 2-14, 2-15, 3-4, 3-5, 3-6, 3-10, 3-11, 3-15, 3-16, 3-20, 3-22

Carrying Capacity iii, 3-6, 3-10, 3-11, 3-16, 3-25

Checkerboard Lands 1-7, 1-8, 1-11, 1-12

Chukar (See Wildlife) xi, xii, 2-14, 2-15, 3-6, 3-11, 3-16, 3-22

Condition (Vegetation) ix, 1-1, 1-4, 2-7, 2-8, 3-1

Coordinated Resource Management and Planning (CRMP) iii, xiv, 1-4, 1-16, 1-17, 2-20, 3-1, 3-2, 3-3, 3-4, 3-6, 3-7, 3-9, 3-14, 3-15, 3-21, 3-22

Council on Environmental Quality (CEQ) 1-1, 2-24

Critical Growth Period 1-4

Cultural Resources iii, 1-11, 3-1

Custodial Management (Category C) vi, viii, 1-1, 1-5, 1-6, 1-7, 1-9, 1-16, 3-5, 3-6, 3-7, 3-14, 3-15, 3-19

Employment (Unemployment) xiii, 2-17, 2-18, 2-20, 3-7, 3-17, 3-25

Erosion (See Soils) viii, 1-18, 2-1, 3-2, 3-9, 3-12, 3-15, 3-19, 3-20, 3-25

Existing Use v, 1-2, 1-3, 1-4

Federal Land Policy and Management Act (FLPMA) 1-11, 1-15

Fisheries 2-3, 2-4, 3-9

Forest Service 2-13, 2-20

Forage Condition and Trend 1-1, 1-4, 2-6, 2-7, 2-8, 2-10, 2-11, 3-2, 3-3, 3-9, 3-14, 3-15, 3-19, 3-20, 3-21

Grazing Treatments 1-4, 3-5

Herbicides 1-4, 1-6, 1-9, 1-14

Herd Management Area (HMA) 1-8

Herd Use Areas (HUA) v, 1-8, 2-15, 3-6, 3-11

Hunting xii, 2-14, 2-20, 2-23, 3-6, 3-7, 3-11, 3-12, 3-17, 3-23

Income xiii, 2-17, 2-18, 2-20, 2-21, 2-22, 3-7, 3-8, 3-12, 3-13, 3-17, 3-18, 3-23, 3-24, 3-25, 3-26

Intensive Management (Category I) vi, viii, x, 1-1, 1-7, 1-16, 3-4, 3-5, 3-6, 3-7, 3-9, 3-11, 3-12, 3-14, 3-15, 3-17, 3-19

Land Treatments iii, v, 1-7, 3-1, 3-17

Licensed Use 1-2, 1-3

Maintenance Management (Category M) vi, viii, 1-1, 1-6, 1-7, 1-9, 1-16, 3-5, 3-6, 3-7, 3-14, 3-15, 3-19

Management Framework Plan (MFP) 1-7, 1-9, 1-16, 2-1, 2-11, 2-12

Mitigating Measures 1-11, 1-15, 3-1

Monitoring iii, xiv, 1-1, 1-4, 1-7, 1-11, 1-15, 1-16, 3-1, 3-3, 3-4, 3-5, 3-6, 3-7, 3-9, 3-11, 3-15, 3-20, 3-22

Mule Deer (See Wildlife) v, xi, xii, 1-1, 1-2, 1-3, 1-4, 1-5, 1-7, 1-11, 1-12, 1-13, 2-13, 2-22, 3-3, 3-5, 3-6, 3-10, 3-11, 3-12, 3-14, 3-15, 3-16, 3-17, 3-21, 3-22, 3-23, 3-25

National Environmental Policy Act (NEPA) 1-1, 1-11, 2-1, 2-24, 3-1

National Historic Preservation Act (NHPA) 1-11

National Resources Defense Council (NRDC) 1-1

Nevada Department of Wildlife (NDOW) 1-15, 2-13, 2-14, 3-3

Nongame Birds (See Wildlife) xi, xii, 2-14, 3-6, 3-11, 3-16, 3-22, 3-25

Off Road Vehicles (ORV) 2-14, 2-23

Overutilization xii, 2-1, 2-6, 2-9, 2-13, 2-14, 3-4, 3-9, 3-10, 3-11, 3-14, 3-20, 3-25

Periods-of-Use iii, 1-1, 1-2, 1-3, 1-4, 1-11, 1-12, 1-13, 1-15, 1-16, 2-6, 2-23, 3-3, 3-4, 3-6, 3-10, 3-14, 3-17, 3-19, 3-20, 3-21, 3-22

Ranch/Rancher xiv, 2-16, 2-17, 2-19, 2-20, 2-21, 2-22, 2-23, 3-7, 3-9, 3-12, 3-13, 3-17, 3-23

Range Improvements/Facilities iii, v, xii, xiv, 1-4, 1-6, 1-7, 1-9, 1-18, 2-16, 2-22, 2-24, 3-1, 3-2, 3-4, 3-12, 3-14, 3-15, 3-17, 3-19, 3-20, 3-23, 3-25

Recreation xii, 2-15, 2-20, 2-23, 2-24, 3-6, 3-9, 3-11, 3-12, 3-17, 3-19, 3-22, 3-23

Reasonable numbers v, 1-1, 1-4, 1-5, 1-7, 1-11, 1-12, 3-5, 3-14, 3-16, 3-17, 3-21, 3-23

Riparian Habitat viii, x, 1-4, 1-9, 1-15, 2-1, 2-6, 2-9, 2-12, 2-14, 2-15, 2-23, 3-2, 3-4, 3-5, 3-6, 3-9, 3-10, 3-11, 3-15, 3-19, 3-20, 3-25

Sagebrush control (also see Vegetation & Wildlife) 1-4, 1-6, 1-9, 1-14, 3-3, 3-4, 3-14, 3-20

Sage Grouse (See Wildlife) xi, xii, 1-15, 2-14, 3-5, 3-6, 3-11, 3-15, 3-16, 3-22, 3-25

Sediment (Soils) viii, 2-1, 2-2, 3-4, 3-12, 3-25

Seedings (See Vegetation, Livestock) xii, 1-4, 1-9, 3-2, 3-3, 3-4, 3-6, 3-14, 3-15, 3-17, 3-19, 3-20, 3-25

Selective Management 1-16

Sheep 2-16, 2-20, 3-7, 3-8, 3-12, 3-13, 3-18, 3-21, 3-22, 3-23, 3-24

Soils 2-1, 2-2, 3-2, 3-9, 3-12, 3-19, 3-25

Spraying (Herbicide) 1-4, 1-9, 1-14

Studies 2-15, 2-16, 3-1, 3-2, 3-5, 3-9, 3-11

Suitability 2-3, 3-2

SVIM (Vegetation Inventory) 2-6, 3-2

Threatened/endangered (plants & animals) iii, 3-1

Threshold 3-1, 3-2

Trend (See Vegetation) 2-9, 2-10, 2-11, 3-1, 3-2, 3-3, 3-4, 3-9, 3-10, 3-14, 3-15, 3-19,

Unavoidable - Adverse 3-1, 3-6, 3-12, 3-16, 3-25

Utilization Studies/levels xiii, 1-1, 1-11, 1-13, 2-16, 3-1, 3-3, 3-11, 3-14, 3-19, 3-20, 3-22

Vegetation

  Ecological Condition and Trend 1-1, 1-4, 1-7, 1-11, 1-15, 1-18, 2-6, 2-9, 2-10, 2-11, 2-13, 2-14, 2-16, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-9, 3-10, 3-11, 3-14, 3-15, 3-19, 3-20, 3-21, 3-25

  Production iii, 1-1, 1-4, 1-7, 2-6, 2-16, 3-1, 3-2, 3-3, 3-4, 3-10, 3-11, 3-12, 3-15, 3-19, 3-20, 3-21

  Type 2-3, 2-9, 2-12, 2-14

  Utilization iii, 1-1, 1-4, 1-15

Visual Resource Management (VRM) 1-15, 2-15, 3-1

Water (Quality and Quantity) iii, viii, 2-3, 2-4, 2-5, 2-9, 2-14, 2-15, 2-16, 3-1, 3-2, 3-9, 3-14, 3-19, 3-25

Watershed (See Erosion) viii, 1-15, 1-16, 1-18, 2-1, 2-2, 2-3, 3-2, 3-10, 3-25

Wild Horses xii, xiv, 1-1, 1-2, 1-3, 1-4, 1-6, 1-7, 1-8, 1-10, 1-11, 1-14, 1-15, 1-16, 2-1, 2-6, 2-9, 2-13, 2-15, 2-23, 2-24, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-9, 3-10, 3-11, 3-12, 3-14, 3-15, 3-16, 3-17, 3-19, 3-20, 3-21, 3-22, 3-23, 3-25

Wilderness iii, 1-11, 3-1

Wildlife (See also Mule Deer, Nongame Birds, Chukar, Sage Grouse) xi, xii, xiv, 1-4, 1-6, 1-9, 1-14 1-15, 1-16, 1-18, 2-3, 2-4, 2-6, 2-9, 2-12, 2-13, 2-14, 2-15, 2-20, 2-23, 2-24, 3-2, 3-4, 3-5, 3-9, 3-10, 3-11, 3-12, 3-15, 3-17, 3-19, 3-21, 3-23, 3-25

Bureau of Land Management
Library
Bldg. 50

Form 1279–3
(June 1984)

BORROWER'S

SF 85.35 .N3 R46 1982
Proposed domestic liv
grazing management p

DATE LOANED	BORROWER

USDI – BLM

Bureau of Land Management
Carson City District
1050 E. William
Suite 335
Carson City, Nevada 89701

POSTAGE AND FEES PAID
U. S. DEPARTMENT OF THE INTERIOR
INT 415

U.S.MAIL